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Editorial

Science so dominates our lives, both culturally and economically, that its place as a major study at all school levels must be acknowledged. In the Red Brick universities this has already been done. Even at Oxford recognition of science as central is forcing a readjustment of balances, the arts becoming ancillary to mathematics and science. Mr. J. P. Corbett, in The Listener of November 1, speaking of his own subject, Philosophy, writes, 'It purported to be what it had been, the axle upon which all thought revolved, but in fact it was largely spinning in a void.' And further on, more generally, he says, Oxford "will either be forced to make science the centre of its studies or will become an ornament on the national mantelpiece."

Science is important not only in itself as pure theory, not only as an aid to economic effort in raising standards of living, but as a weapon in international competition. The latter aspect has of late impressed its urgent importance upon not only scientists, but upon statesmen and educators. Any nation hoping to keep its head above the agitated waters must produce an adequate number of scientifically trained people, and this training must begin early.

And so what of our high schools? At the start we are bedeviled by our disparate and conflicting high school aims: to train as we say for life or living, to disclose vistas of interest, and to lay the grounds for further training leading to specialization. If only the right students would pursue the right aims and stick to them all would be well, or relatively so. In at least the larger schools, suitable courses appropriate to each aim could be devised. We are bedeviled, in the second instance, by a vicious circle: unchallenging courses in science, listless students, and a scarcity of adequately trained science teachers. The circle's viciousness is obviously exacerbated in an age of spreading technology by high wages outside teaching. Whether scientific subject matter should be presented divisionally by subject, in correlation, or in fusion appears yet to be in debate. What does seem clear is that science teaching must begin early, mastery of theory must be assured, and specialization begun no later than Grade XII.

If philosophy must jettison much of its earlier content, as Mr. Corbett affirms, so perhaps should social studies and the arts generally. Of history specifically Mr. Corbett writes, "What happened in the United States in the ninteenth century, in Russia in the early twentieth, and is happening in China now is of incomparably more importance to the rising generation—than anything that happened in Europe more than 300 years ago."

Elsewhere in this issue Mr. Ian MacDonald considers the growth of science and its likely impact upon education.

EDUCATION IMPORT OF THE GROWTH OF LEARNING

IAN C. MACDONALD
Journalist

One of the chief characteristics of life generally and of human life in particular is growth. We have good reason to appreciate this today. On every side we can see things growing, not only living things but populations, governments, industries, urban centres, school systems, universities, traffic, utilities, organizations, and so forth. In every case the growth reveals certain features: increase in dimensions or mass or numbers; more and more specialization; increasing complexity; and the development of communications systems. There usually rises, in addition, a demand for ever more and ever better inter-communication, to counteract the effects of increases in specialization and complexity.

All this growth may be attributed primarily to biological urges and the nature of man but at several removes from the biological level it may be largely attributed to the growth of learning. The students of population tell us that it is not so much high birth rates as reduced death rates which are responsible for the unprecedented growth of populations at the present time; and it is the application of new knowledge in medicine, public health, sanitation, nutrition, and so forth, which has reduced the death rates. Indeed, to over-simplify in order to put it very briefly, the growth manifested on every side is mainly due to the growth of scientific and technical learning, which during the past century or more has been proceeding at a rate probably much higher than that for the growth of the human inheritance of learning in general.

In any event, it can be shown, as we shall see presently, that scientific and technical learning has been growing very rapidly during the present century. It may be supposed that this growth has some meaning for formal education, especially for scientific and technical work, if only because the transmission of learning must be regarded, at the very least, as one of the prime functions of formal education. But what *is* the meaning?

The writer has attempted to answer this question in a large thesis submitted to the University of Alberta in the fall of 1956.[1] This thesis undoubtedly could be boiled down but the information and the argument are rather extensive to be compressed into a few

[1] "Effects of Growth of the Inheritance of Learning: The Meaning of the Growth of Scientific Information for Education for the Advancement of Scientific Knowledge"—submitted for the degree of Master of Education.

thousand words without leaving many gaps. All that will be attempted in the present article is a sketch of the data presented in the first part of the thesis, an outline of the results of analysis in the second part, and a digest of the conclusions respecting educatiton reached at the end of the second part and in the third.[2]

I—NATURE OF THE GROWTH

To begin with, consider briefly the growth of the inheritance of learning in general. This growth is indicated by the increases in university library collection.[3] The average holdings of ten university libraries founded in the United States prior to 1821 have been doubling every sixteen years since 1821. The average now exceeds 3,000,000 bound volumes, half of which have been acquired within the past sixteen years! But this does not tell the whole story. The Harvard library contains more than 5,000,000 volumes.

Assume that the Harvard collection was built up somewhat earlier and that half of it was acquired within the past thirty-five years. Subtract from these 2,500,000 volumes any light fiction titles, any reprints of titles originally published prior to 1900 and any volumes published between 1900 and 1922 which might be considered as having been superseded. Make generous allowance for duplication in the material within the covers of the volumes. The number of volumes and the amount of material remaining *still* would dwarf the capacity of the single mind and the time for learning at the disposal of the individual. In relation to the output of the multitude, ignorance is bound to be the lot of every man.

However, let us come down to a somewhat more practical level and consider the problems with which the growth of published scientific and technical information confronts the individual specialist. Although he must pay attention to some books, he is primarily concerned with the information being published in scientific and technical periodicals. The number of these periodicals doubled during the second quarter of this century and now is about 50,000. They are publishing at least 350,000 and more likely 500,000 to 600,000 *useful* papers and articles per year.[4] The gross output of

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[2]To conserve space, and because specific references here would mean very little, sources will not be cited. Documentation will be assumed to be given under "1". Bibliography will be found under "1" pp. 291-305.

[3]The size of a representative university collection cannot, it is true, be regarded as a direct measure of the amount of accumulated learning or knowledge; for there must be much duplication and much that is superfluous in such a collection. Its size is a measure of the amount of published information in which knowledge is embedded. But to find the knowldege the learner must wade through a large proportion of the published information in any field.

[4]By **useful** is meant those deemed worth summarizing for notices in abstracting or indexing periodicals. The editors of such periodicals, which speed the investigator's search for information relevant to his own work, are highly selective in choosing the papers and articles to be summarized in a couple of paragraphs or a few lines.

papers and articles in the periodicals has been estimated at up to 1,850,000. An analysis of the available figures shows that the annual output, at least in the useful category, has been increasing, except during the two war periods, throughout the present century; it now is much higher than it was only twenty years ago. As a result, the accumulation of useful scientific and technical information, with embedded knowledge, has been growing exponentially and thus doubling in a certain period of years—probably about fifteen. The accumulation now is mountainous.

A search for pertinent scientific or technical information is not generally carried back more than twenty years in the periodical "literature". When account is taken of this reducing factor, the net doubling period turns out to be about forty years, which is less appalling than fifteen years. Yet the twenty-year accumulation for 1934-53, which falls in the useful category and must be considered actually or potentially of value to current endeavor in science and technology, probably amounts to around 7,500,000 papers and articles. This is to say nothing of books (properly speaking and not including bound volumes of periodicals) which it may be advisable for the investigator to consult because they draw together, organize in some coherent way and interpret in a fresh light masses of information which have accumulated in periodicals.

It would be quite impossible, of course, for any individual to read more than a very small fraction of the primary information published in a year. As Sir Edward Appleton of Great Britain put it some years ago, anyone who set himself the task of merely reading, let alone understanding, all the journals of fundamental science would discover at the end of the first year that he was already ten years behind. If he were to include the technical "literature" as well, the end of the first year would see him one hundred years behind. The trouble is, however, that it is becoming extremely difficult to keep abreast even in a very limited sector. Similarly, a search of the whole accumulation of twenty years would be impossible for the individual; but, unfortunately, even a search in a limited sector is becoming extremely difficult. Indeed, as many scientists and engineers have testified since the end of the Second World War, and were testifying even earlier, the flood of current "literature" is becoming a substantial impediment to the pursuit of scientific and technical research.

These men speak, to cite a few examples, of the investigator being "staggered by the findings and conclusions of thousands of other workers . . . which he cannot find time to grasp, much less to remember, as they appear"; of "torrents and rivers of current

literature pouring themselves into libraries . . ."; of the progress of science "being impeded by the fact that the most brilliant men simply do not have enough learning capacity to acquire all the details of more than increasingly narrow segments of the field of knowledge"; of "a truism" that "no scientist can read all that is of value to him and still have time for his own research". Yet the communication of results, which is at once the cause of the flood and the origin of the trouble, is essential for the pursuit of scientific inquiry—information is "the lifeblood" of science, and technology. Every individual who penetrates or pushes back the frontier of the unknown is standing on the shoulders of his predecessors and charting his course, from that vantage point, with the help of contemporaries who are advancing in the same or in some related direction. Or, as a Canadian scientist has suggested, inquiry is like a chain reaction in which many individuals are continuously bombarding one another with fresh results and new ideas, and knocking still more results and ideas out of one another's minds.

II—EFFECTS ON SCIENTIFIC ENDEAVOR

A comprehensive analysis of the effects of the growth of scientific and technical information (and embedded knowledge) upon scientific and technical endeavor cannot be presented in this space. However, some of the conclusions to which such an analysis leads can be stated fairly briefly.

Consider, first, direct effects of volumetric growth. It is, of course, generating more growth, but it also is:

(1) making it increasingly difficult and in some cases impossible to keep up with current output even in a narrow sector, the difficulty being the greater, the wider the area of interest;

(2) making search and documentation exceedingly difficult, especially when the investigator must delve into the legacy of the past upon which present achievements usually must be founded; exhaustive search under a heading which requires reaching into a number of sectors or fields has become in most cases impractical in terms of time and effort;

(3) slowing down and interrupting the whole circulation or exchange of information so vital to scientific and technical endeavor.

Increasing Specialization

A major effect, due to the ever-growing disparity between the current and accumulated production of the multitudes of investigators and the limited capacity of the single mind, is increasing

specialization. This, in turn, has had subsidiary effects such as the following.

Specialized concentration of inquiry, when complemented by effective intercommunication, has done much to advance science and technology. It has been partly responsible for powerful additions to the tools at the disposal of the investigator—instruments, mathematical and logical systems, modes of operation, and so forth. It has provided the detailed knowledge essential to the theoretical merging of physics and chemistry at the microcosmic extreme (quantum theory), the partial merging of chemistry and biology in the microcosmic realm of biochemistry, and the formulation of the modern synthesis of evolution.

But, once made, such gains exact their price from succeeding investigators. The use of a larger tool-set demands knowledge of more tools and greater versatility in experiment and observation. To take full advantage of coalescing theory the investigator may have to acquire a greater variety of knowledge and in his inquiry embrace a wider area, which would put him up against the problems of search, documentation and keeping up with the flood in aggravated form. Moreover, in vast regions of science and technology, specialization, notwithstanding its advantages, hinders many an investigator in the search for new knowledge by leaving him ignorant of much outside his specialty which is relevant to his inquiry; by narrowing his vision or leading him into a picayune concentration of attention; by increasing the likelihood of his misinterpreting results gathered in unfamiliar territory; by reducing or preventing communication with others engaged in different but pertinent specialties; by reducing the cross-fertilization so often fruitful for investigators in different areas. It is partly responsible, too, for the multiplication and the individual growth of dialects which, because of their specialized terms, are fully and correctly understood only by initiates. These dialects often cause difficulty or confusion in communication, though within a major division of science or technology they show many terms in common, and though this also is the case for two divisions where these have coalesced; e.g., for physics and chemistry at the microcosmic extreme.

Growing Complexity

The volumetric growth of information at an accelerating rate, as it dwarfs individual capacity more and more, fosters ever more and ever narrower specialization, and this in turn not only increases the fragmentation of information but generates ever more information, though quite possibly a declining proportion of useful information. That, in the abstract, may be regarded as the primary cycle. How-

ever, another aspect of the process can be seen: a growing complexity both in the fabric of information and embedded knowledge and in the pattern of endeavor. So great is this complexity even now that the whole structure of information and knowledge and endeavor has been aptly termed a maze.

Responses to the increase in complexity take two main forms:

(a) There is an effort to improve communication among individuals and groups with a view to making the pattern of endeavor more coherent and the results of endeavor more synthetic; i.e., with a view to making endeavor more effective in putting things back together again.

(b) There is a strong inclination on the part of the individual not merely to shy away from breadth in inquiry because of the difficulty of achieving breadth, which fixes existing specialization, but even to specialize still more narrowly, which of course must add to the difficulty of intercommunication.

Response (a) has been facilitated by the coalescence of physics and chemistry at the microcosmic extreme (the atomic but not necessarily the nuclear level), by the partial merging of chemistry and biology at the molecular, microcosmic extreme and by the formulation of the modern synthesis of evolution, and also, to a lesser degree, by the formulation of theories of relativity and of modern cosmology at the macrocosmic extreme in physics. However, from the standpoint of science as a whole, this response has, at the same time, been made more difficult by "horizontal" growth in science; that is, for instance, by the broadening of the region embraced by biology and by expansion of inquiry in the region of social science where the subjects of investigation are even more complex than in biology.

Specializing still more narrowly (response 'b') is tantamount to carrying to still greater extremes the application of the rule, divide and isolate, to the subjects of investigation—a tactic which is analogous to analysis in the actual conduct of inquiry. The application of the rule may be extended thus in the hope of finding basic elements common to two or more areas of investigation. A gain in this direction is to be welcomed but it is not likely to be consummated without much help from (a), which evidently is the primary necessity in the face of the increase of complexity.

Not So Simple

Another significant and troublesome result of the growth is the discovery of more and more complexity in the systems of the natural world which are under scientific investigation. As analysis has

been refined and pressed deeper in search of still simpler elements and still more fundamental principles, with which fresh and more powerful syntheses might be formulated, it has become increasingly evident that things are not nearly so simple as they once seemed. In effect, the fruit of analysis has been the revelation of complexity.

Those assertions could be illustrated with many examples from macrocosmic and microcosmic physics, chemistry and biology but all that will be attempted here is a superficial statement on one from physics and on one from biology.

The quantum theory of atomic systems, virtually completed in the early thirties, gives a fairly satisfactory and a workable account of the physics of the atom, but as experimental analysis was pressed deeper into the nucleus of the atom it revealed a bewildering multiplicity of interdependent or interacting, fundamental "particles"—still more complexity at a deeper level—for which a coherent theory or consistent description has yet to be formulated.

In its simple form, largely attributable to Pasteur, the germ theory held that disease (of certain kinds) was due to an invasion by microbes. Futher study has convinced many biologists that that simple theory is not tenable—"disease is a complex process that depends on the interactions of an injurious agent, a susceptible patient and a particular environment". Natural resistance may be, in some cases of microbial disease, a more important factor than the virulence of the germs.

While analysis, the application of the rule, divide and isolate, continues to reveal complexity, we are not, in general, well equipped to deal with it directly. If the threshold of complexity be defined as the interaction of two elements, then it can be shown that in physics, generally regarded as the most advanced of the sciences, we are unable to produce an "exact" mathematical solution of a state of complexity beyond the threshold level. For instance, in celestial mechanics, in a problem involving three or more interacting bodies resort must be had to such a method of solution as successive approximation. This may give sufficiently accurate results for all practical purposes, but it may also gloss over or leave unexplained a highly significant discrepancy, as general relativity has demonstrated.

The discovery of more and more complexity in systems under investigation may eventually demand radical departures from the predominantly analytical traditions and modes of language, mathematics and thought, though analysis will remain indispensable. Without analysis, indeed, the existence of a state of complexity cannot be determined.

Communication and Language

Some of the effects of the growth upon scientific and technical endeavor have now been briefly described. Many efforts to overcome or at least to offset these effects are being made. There is no space to discuss them here. But what is required essentially is improvement of communication: between investigators who are contemporaries, between the investigator and his predecessors via the record of their results, between the investigator and the natural world via experiment and observation. This means that the investigator must gain better command of the means of communication: verbal, mathematical and graphic forms of language; reading, writing and speaking; the methods of scientific and technical inquiry. There is a great and growing need, for instance, for clearer and more concise writing of papers, and for more use of plain English, or the appropriate plain vernacular tongue, which not only is the only language common to all those who must communicate about scientific and technical matters but also is the leaven in the bread of "technical" discourse without which this discourse may collapse of its own weight.

But it is not enough simply to improve the investigator's command of the arts of communication and inquiry; he must *know*, if he is to have something to communicate, if he is to understand what another is trying to communicate, if he is to cross the frontier between the known and the unknown with sufficient strength to explore the new ground extensively in depth or breadth or in both dimensions. Yet one of the main effects of the growth is the dwarfing of individual capacity by the accumulated output of the multitude of investigators. How is the investigator to avoid or to offset this dwarfing, let alone acquire more knowledge, relatively speaking, than his predecessors of ten or twenty or fifty years ago had at their individual command? This is an educational problem, which will be discussed presently, but one conclusion can be drawn at this point: that the investigator must acquire knowledge in its most compact and powerful form, as much as possible. Generally speaking, then, he must focus his learning on basic principles and fundamental theories, in which scientific and technical knowledge is, so to speak, compressed into a shorthand, and which also are powerful instruments for further inquiry. The educational road to the mastery of this form of knowledge is, of course, long and hard; but this is a matter which will be dealt with presently.

III—MEANING FOR EDUCATION

In spite of the unavoidable sketchiness of the presentation in the preceding sections of the effects and problems of growth as these have developed within the scheme of scientific and technical endeavor, it should be obvious to the reader that the situation has some meaning for education for scientific and technical work. However, to make this meaning clear in some detail, it will be necessary to set out certain of the educational problems arising from the growth and then to consider what the solution of these problems demands in the nature and the design of educational programs and courses. Only a summary discussion can be presented here.

The main problems may be stated compactly as follows:

(A)—The volumetric growth is continuously increasing the amount of information and knowledge which the investigator needs for his work, and thus, also, the amount of ground which *apparently* needs to be covered in formal studies, and the period of time which *apparently* needs to be devoted to formal learning.

Yet the danger of overloading the mind and that of learning merely "less and less about more and more" have to be avoided; one must reckon with the need for pace in learning; the student-investigator needs to be educationally equipped to begin scientific work early enough to get full advantage of youthful energy, originality and productivity; and his formal learning period cannot be indefinitely prolonged, nor his attainment of normal adult status as wage-earner and private householder be indefinitely postponed, without detriment to his personal well-being.

(B)—In learning as in inquiry, which is hardly surprising when each partakes of the nature of the other, specialization sooner or later becomes inescapably necessary for the individual. Limited capacity, individual talent and aptitude, and the advantages of concentration of effort—all these demand it. Moreover, it is essential to get below the surface and plumb the depths in any field of knowledge.

But with the volumetric growth, any given degree of specialization becomes narrower and narrower in relation to the total mass of information and knowledge. Moreover, the degree of specialization, measured by any fixed standard, is likely to be increased because the frontier of knowledge is being pushed back and the road to be travelled by the learner is being lengthened. The danger is that the individual may, so to speak, "learn more and more about less and less, until he knows everything about nothing". This is certainly to be avoided.

(C)—The learner is faced with the need of achieving both greater depth and more breadth in his education, the former because inquiry is being pressed ever deeper into the nature of things, the latter because of coalescence or merging and in order to counteract the adverse effects of specialization. In short, he needs to acquire both deeper and broader knowledge, in spite of the limitations of individual capacity and the limited time and effort which can be given to learning in the period of formal studies. How is this need to be met?

(D)—Due to the problems of complexity and those associated with the more and more extreme states into which investigators are looking, together with certain other factors, fundamental inquiry is becoming increasingly difficult, especially when it comes to the formulation of comprehensive theories. The student-investigator, therefore, needs qualitatively better education for his work, especially though not only if it is to include basic

research. The upward trend in qualitative requirements may be expected to persist. This tends to increase the difficulty and the size of the educational task, and the time needed for it.

A theoretical resolution of these problems will now be presented in condensed form. For this purpose, the problems have been set out in a table with some elaboration. Referring to this table, it should be noted that the apparent demands, far from being of the "once and for all" sort, are persistent and have to be regarded as ever-increasing. The adverse prospect is what is to be expected if the attempt to meet the demand should exceed the limiting conditions. The pitfall of reaction to the adverse prospect, in each case, should be regarded merely as typical or representative. It is assumed that the period of formal studies should not exceed a limit; twenty years all told. In (B) Primary (See Table, columns 1 and 2), the limiting condition rests on a assumption that there is a minimum of intercommunication below which returns from inquiry would diminish.

More Knowledge

Further specialization has long been used as a mode of escape from the difficulties involved in attempting to satisfy the (A)-P demand and also to elude the demand itself. But the hope of thus eluding the demand has, in practice, been disappointed. What is more, further specialization may make its own adverse prospect a reality, and many scientists think this (B)-P penalty is already being incurred. Then, however useful specialization may be for avoiding the penalty and the pitfall of (A)-P, it will not do for eluding (A)-P; and, in any case, to elude the demand is not to satisfy it.

Any attempt to meet the demand, to some extent, within the period of formal studies, will require the elimination of non-essentials from program and courses, to make more room for the acquirement of knowledge and of the arts of learning. Is there anything which can be and even should be eliminated?

The rapid growth of scientific and technical knowledge and the even more rapid development and diversification of technology on the basis of this knowledge have made accelerating change the dominant characteristic of economic, social and political life. As a result, the requirements of existing forms of endeavor and vocations are rapidly changing, some vocations are gradually becoming obsolescent, new lines of work are being created, and the educational requirements for earning a living and meeting the responsibilities of citizenship are generally being raised. The "technical" details and routines of current practice are most susceptible to change. Some are fading out almost daily; indeed, those which appear in

(1)	(2) Apparent Demand Primary	(3) Secondary	(4) Limiting Conditions	(5) Adverse Prospect	(6) Pitfall Of Reaction	(7) Mode of Escape
(A)	More knowledge		Capacity and time of the individual	Overloading student	Superficiality in courses and learning	Specialization
		More time for formal learning	Earning living Family needs Productivity	Prolonging formal learning	Rejection of formal learning	
(B)	Further specialization		Necessity of intercommunication	Narrowing to point of diminishing returns	Superficial broadening courses	
		More time to reach frontier	See (A)—Secondary	See (A)—Sec.	See (A)—Sec.	
(C)	Both greater depth and more breadth		As for (A)—Primary	As for (A)—Primary	Between the two stools	
		(A)—Sec. augments by (B)—Sec.	(A)—Sec.	(A)—Sec.	(A)—Sec.	
(D)	Qualtitatively better education		Capacity of individual	(Unspecified)	(Unspecified)	
		More education	(A)—Sec.	(A)—Sec.	(A)—Sec.	

textbooks may be obsolete before they are taught. In any case, they often differ greatly from one commercial establishment or government department to another. Thus, there is little point in teaching them; and by reducing them to a minimum in formal studies more room can be obtained for any attempt to meet (A)-P.

Another way of making more room is to focus learning on basic principles and fundamental theories of proven durability. The student, as already noted, should strive for and acquire knowledge in these most compact and powerful forms as rapidly as possible, as scientists and others are testifying in growing numbers. But this will require the student to follow a hard road and one which is growing somewhat longer as inquiry is pressed deeper into the systems of the natural world. In trying to resolve the volumetric problem by this means, therefore, we are faced with the secondary problem of time—(A)-S. How can more time be made available for essential learning within the limited period of formal studies.

The school week and the school year, or both, could be lengthened, as in some European countries, but this could cause faltering in pace or lead into the (A)-S pitfall. By grouping or enriching within the grade at certain levels, the more able students could be permitted to learn at a higher rate and thus economize on their time; we shall have to come to this eventually. In addition, time-wasting and unessential paraphernalia, courses and practices in present programs could be drastically reduced or eliminated, partly by putting the student more on his own mettle and partly by deliberately cutting them out. Must not this be done sooner or later?

Since the demands (A)-P and (A)-S are persistent and ever-increasing, the adoption of the above means for meeting them in part is a matter of sheer necessity.

Further Specialization

Specialization is, for the individual, inescapable in scientific inquiry and demonstrably fruitful. In learning, it also is inescapable and fruitful as it permits the student to dig below the surface of the field and make a penetration in depth to the fundamentals. But specialization must be complemented by effective intercommunication; and, as already noted, with increasing specialization and complexity, the investigator must gain better command of the arts of communication (and of inquiry). So, also, during the period of formal studies. The study or at any rate the improvement of command of these arts must be vigorously pursued throughout the period of formal studies, including the postgraduate stage, and, indeed, beyond. This may add to the load on the student in advanced stages, as compared with present loads, but the additional invest-

ment of time and effort should be offset by increasingly rich dividends as the student advances higher in formal studies and passes on into professional work.

Still, the problem presented by the (B)-P demand remains, only partly resolved by the improvement of communication. If students are not to be fitted out with intellectual blinkers, even the present degree of specialization in many cases must be mitigated. But how? By broadening the science courses in school and university and by giving more "broadening" courses in the humanities at university? The accumulation both in the scientific and in the humane domain of scholarship is enormous, and inexorably increasing. How, then, is broadening to be achieved, within the limits of student capacity and time, without falling into the pitfall of superficiality?

The (B)-P problem, it is plain, leads into the problem (C)-P. How are both depth and breadth to be achieved, actually, because of the growth, ever greater depth and ever more breadth? This, without overloading the student or merely falling ineffectually between the two stools.

Depth and Breadth

The theoretical resolution of (C)-P, so the writer submits, is determined by these considerations:

(a) Specialization itself testifies that the impossibility of the individual keeping up with the increasing breadth of the scientific or any other domain has long since been accepted.

(b) By the same token, keeping up with the increasing depth has been recognized as a necessity. Whatever else he may do, the investigator must penetrate the territory of the known right to the frontier, on one line at least, if he is to invade the unknown and have any prospect of discovering something new.[5]

(c) Learning and mastering the arts of inquiry (of thinking, observation and experiment, and communication, plus technique) require not only instruction but practice, and practice not only imitative but heuristic. Accordingly, the student, like the investigator, though within appropriate limits, must carry out inquiries in depth, and for this he must learn in depth.

Thus, depth cannot and must not be given up; and the student's limited capacity and time will be stretched in this direction, more and more as he proceeds to higher stages of education. Under these conditions, breadth can be obtained, as well, only by giving up the idea of covering—as it were, without leaving any large gaps—the

[5]It is assumed here, since there is no space to argue the point, that the student had best be prepared for the role of investigator, in search of new knowledge, whatever the sort of scientific or technical work he may be expected to undertake.

whole range of knowledge in all domains, in one domain, in one region or field, and perhaps even in one area or sector in some cases, until such time as the ultimate stage of single-track specialization may be reached and the student-investigator may be proceeding along a chosen path to the frontier. This last stage probably should be deferred as long as possible.

Not that such coverage, in a fairly detailed way, is not attempted even now; but what is being contended here is that, to maintain depth appropriate to the stage of education and at the same time to obtain breadth while avoiding superficiality, those who design programs and courses will have to become far more selective and may well have to leave larger gaps, filled only with connecting material, in order to choose areas or sectors in which learning can be concentrated in depth. To ensure that a sense and a grasp of the breadth, say, of a subject, are obtained horizontal connections will have to be establishd between areas or sectors of concentration. Moreover, because scientific knowledge is extremely cumulative, vertical connections will have to be maintained, and even vertical continuity. These connections, horizontal and vertical, will be determined by the means available and by consideration of what is best suited to the subject and to the stage of education.

At the present time, breadth is being sought in school and university by means of "general" courses spread thinly over a vast territory, "catch-all" courses dealing superficially with a wide variety of information, "broadening" courses made prerequisite to or necessary accompaniments of fairly specialized undergraduate education for professions, "survey" courses, and the like. The adoption of a system of concentration in connected areas or sectors, in the more extreme form here proposed, would require the radical revision of most courses of the types noted above; some probably would have to be replaced altogether, and a few would be eliminated. The selection of areas of concentration undoubtedly would be difficult in many cases; but the difficulty would be eased at the outset if the "technical" details and routines of current practice were reduced to a minimum, if the principle of fundamental focus were adopted and given effect, and if education were to get away from the idea that the student should know at each successive stage, largely for its own sake, so much specified factual information.

The unacceptable alternative to the above, so it seems to the writer, is more and more to turn out, on the one hand, products of "general" education who know very little about many things, and, on the other, products of highly specialized education who know many things about very little. Thomas Henry Huxley, the nine-

teenth century biologist and spokesman for evolution, once suggested that to be educated a man should know everything about something and something about everything. But even this has become impossible, within the period of formal studies at any rate, though not necessarily within a lifetime. In addition to languages, the arts of communication and the arts of learning-and-inquiry, the best possible command of which is essential for all, the common program of formal studies should offer depth of *knowledge* in connected areas of concentration in the central parts of the most important fields, and beyond the common program, eventually, specialization should offer great depth of *knowledge* in part of one field or in related parts of several fields. Better command of the vernacular tongue, at least, and of the arts mentioned above should be sought throughout the formal period, including the postgraduate stage, and beyond.

At this point, in the present argument, the resolution of (C)-P must be left incomplete and attention turned to the (D)-P demand for qualitatively better education.[6]

Better Education

The quality of education might be judged, within wide limits and with a large error, by means of achievement tests, say by applying tests standardized for a student population of many years ago to a sample of today's students in order to get a basis of comparison. Because of changes in aims, in curricula and in tests, however, the results would be of somewhat doubtful value. Alternatively, some general criteria might be set up for making a judgment. In the face of the accelerating growth of information, with its embedded knowledge, a single criterion, though general in nature, may be considered of primary importance. It is, briefly, how well the education prepares the student for learning, for learning in the classroom with instruction and help, but, above all, for learning on his own initiative and by his own resources. Relatively speaking, every student is woefully ignorant on leaving school or university, but by learning how to learn efficiently and effectively he will, at least, have acquired the means of reducing or mitigating his ignorance.

Speaking generally and rather abstractly, learning may be described as a process of communication and inquiry. The teacher sends messages to the student; the student picks up messages from

[6]The argument is concerned with the design and make-up of programs and courses, and to some extent with the student's use of available capacity and time, but instruction, materials of instruction and physical facilities are being excluded from its compass. The quality of instructon, of course, has much to do with the quality of education, but the relation between the two will not be discussed here.

other minds, past and present, which have been recorded in print; messages are exchanged btween student and teacher, and they pass between students; as the student reads, writes, talks and thinks as he observes and experiments, there is a flow of messages in his brain. The student learns best by inquiring, by asking questions.

In the face of the growth, then, the student, in order to secure a qualitatively better education, must gain a better command of the arts of communication and inquiry (the arts of learning). In education for scientific work, which is being considered here, the arts of inquiry must, of course, include the methods—there is no such things as *the scientific method*—of scientific investigation. Observing and experimenting and various techniques loom large in these methods. But the art of thinking stands above all, in science as in history and economics, in industry as in government, and the growth is making the command of the art of thinking more important all the time. It is well to remember, however, that thinking and communication are only separated by the artifice of words: there is a close and reciprocal relation between clear thinking and clear presentation.

While instruction helps, in the end there is only one way to improve one's command of the arts of communication and inquiry: by exercising, by practising them, less and less imitatively and more and more heuristically. This is one response which must be made, in education, to meet the demand (D)-P. Significantly enough, a growing body of evidence from research indicates that the exercise of thought increases the physiological capacity of the brain for thinking, though doubtless not beyond the individual's undetermined hereditary limit.

Growth In Mathematics

Of course, the student must have something to practise on, something to communicate, to inquire into and to think about. These things are determined largely by the make-up of the program and the courses; and it has already been shown here that the growth makes certain demands as to their make-up. But the student also needs certain instruments.

Apart from language, and disregarding material instruments because of the limits of space, the most important of these instuments in science and technology, and in education for work in these domains, is mathematics—both a science in its own right and the language of science. Since mathematics, as a field of knowledge, shows the growth, the features of growth, the effects and problems and demands of growth, already described in reference to science and technology as a whole, the conclusions already drawn, as to the

educational import of the demands, apply in general to the presentation and the learning of mathematics during the period of formal studies. In the context of the present section of this article, the student needs to gain a better command of mathematics, at least as an instrument of inquiry and as a means of communication.

Demands For Ideas

Leaving the demand for better education at this point, the writer wishes to deal briefly with one other demand, ever-present in scientific research, which the growth is strengthening; the demand for general or conceptual ideas—if possible, new ideas. This demand has been increased especially by the growing need for new mathematical methods, new modes of thought and fresh, even revolutionary, thinking to overcome the problems of complexity in systems under investigation. To some extent, conceptual ideas, even new ideas, can be picked up in science and technology; they emerge there from time to time. But scientists always have been heavily dependent on borrowing from the humanities or liberal arts. Accordingly, the student-investigator needs to study these subjects, not only for their own value to his education as a whole and to his citizenship, not only for a vaguely defined purpose of broadening his outlook, but also for their utility, because he will need to mine them for ideas, indifferent though he may be to the philosophical matrix in which the useful ideas are embedded. It could be shown, moreover, that at least some of the humanities, history, for example, show rapid growth, with their effects on scholarly endeavor, their problems and demands, and their import for education in the domain of the humanities; but that is another story.

Continuous Learning

When all is said and done, the demands arising from growth of the human inheritance of learning, though they can be partly resolved to show their import for formal education, cannot be satisfied within the limited period of formal studies. It is very doubtful, indeed, whether they can be fully satisfied within the present span of human life, especially when it is recognized that, given an upper limit to human intellectual capacity and persistent, accelerating growth of published information and embedded knowledge, without a general coalescence of disciplines, the dwarfing of the individual capacity by the output of the multitude will proceed. Under these conditions, in spite of our best efforts, we may well become, individually in relation to the whole, more and more ignorant. At all events, it is abundantly clear that the business of learning can only be started, indeed barely begun, during the period of formal

studies. Learning, therefore, must be the business of a lifetime, which re-emphasizes the conclusion, drawn earlier in the argument, that formal studies must prepare the students for learning and inquiry by his own initiative and on his own resources—with this corollary added: that education, by teaching or coaching employees, must be part of the business of private and public enterprises.

As an American businessman has suggested, when the individual graduates from high school or university, he or she is not so much equipped to do something as prepared to learn something:

> It is folly to try to equip students with memorized answers for every problem they will encounter in later life. An advancing world will not wait while one runs the file of his memory to see whether there is a ready-made answer. Proper education, whether it be scientific or otherwise, should provide an adequate background of values, thereby equipping the student to think for himself and to meet new situations in terms of broad concepts rather than in terms of dated recipes.[7]

In a world characterized by accelerating growth and change, the gravest error in education may be to attempt to prepare the student to adjust to the old society of his student days and to fill a vocational niche which existed when he was young.

[7]Ernest Mahler, president, Board of Trustees, Institute of Paper Chemistry, cited in **Chemical and Engineering News** editorial, Sept, 12, 1949.

LIBRARIES IN NOVA SCOTIAN HIGH SCHOOLS

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Libraries are becoming central in modern schools instead of peripheral, or non-existent, as they once were. The conception of how students best learn to think is changing. Instead of concentrating upon a single text, with teacher explanation and comment, students are now invited to compare texts, to search out statistical and other types of information, to weigh and organize relevant data. Not only this, but individual differences may be catered to, different talents cultivated, while good reading habits are presumably being developed.

In view of this, teachers and principals are asking what constitutes an adequate library, what space and arrangement of furniture are desirable, what sorts of books and reference materials are optimal, and by whom and under what conditions the library should be looked after. But first it is only proper to know what the present situation is, and to this end the present study was made.

Method and Sources

For the school year 1954 a thirty-six item questionnaire, prepared by Miss Gwen Smith, was transmitted, with covering letter, to the principals of Nova Scotia's forty-nine largest schools. Forty-six replies were returned. The responding schools ranged in type from Grade VII-XII units to Grade X-XII units, and in population from 29 to something over 800. Two schools of wider grade limits, and six schools of population less than 100, were excluded from consideration, leaving 38 high schools under study.

Accommodation

Of the 38 schools, 37 reported having a library and 35 having a separate room for it. One reported a partially partitioned-off room, and two regretfully confessed that their bona-fide library rooms had to be released for class use. Dimensions of these rooms ran from 3,000 square feet (very exceptional) down to 400, one indeed achieving only 144 square feet.

Seating accommodation was modest. Individual seats and individual places at tables were found separately and in combination. The median number of individual seats was 34 with a range from

105 to 10; and for places at tables, a median of 22, the range being 100 to 5. Apparently about one half of the libraries have adequate accommodation for seating a standard class of 40 pupils, though it must be recognized that the smaller schools are likely to have somewhat smaller classes. For five particular cases, 175 pupils were restricted to 10 seats and no places; 157 to 14 places; 620 to 24 places; 298 to 14 places; and 143 to 6 places. Thirty-five schools reported adequate electric lighting, three inadequate electric lighting.

Library Facilities

Tables I and II show respectively certain library resources and number of volumes on the shelves.

TABLE I

CERTAIN LIBRARY RESOURCES

Item	Yes (%)	No (%)	% Not Reporting
Library bulletin board	73.7	26.3	.....
B.B. used to publicize new reading	60.5	21.1	18.4
Up-to-date card catalogue	81.5	15.8	2.6
Up-to-date accession book	92.1	7.9	.....
Record of books withdrawn	94.7	5.3	.....
Books arranged by sections	97.3	2.6	.....
Sections labelled or marked	71.1	26.3	2.6

TABLE II

NUMBER OF VOLUMES

Volumes	Number of Schools	Percentage
8,000 up	1	2.6
6,000-7,999	0	0.0
5,000-5,499	1	2.6
4,500-4,999	0	0.0
3,500-3,999	2	5.3
3,000-3,499	2	5.3
2,500-2,999	0	0.0
2,000-2,499	4	10.6
1,500-1,999	4	10.6
1,000-1,499	13	34.2
500- 999	6	15.7
0- 499	3	7.8
Omitted	1	2.6

One school, in which the local branch of the regional library was housed, reported 1,000 volumes in the high school library and 2,000 in the regional library. The regional librarian acted as school librarian and new books were added to the regional library but not to the school library. The three smallest high school libraries reported 75, 350, and 425 volumes. The over-all average was approximately 1,200.

To the questionnaire item covering encyclopedias, dictionaries, and periodicals the following summary was obtained:

Item	Number
An up-to-date encyclopedia	37
An up-to-date dictionary	36
World Affairs	36
A French dictionary	34
Time	34
Canada Yearbook	33
MacLean's	32
Saturday Night	30
National Geographic	26
An up-to-date atlas	24
Readers' Digest	24
A German dictionary	19

Others mentioned were a Latin dictionary, Saturday Evening Post, Canadian Geographic, and Newsweek. In many cases the periodicals were contributed by teachers or other persons. One principal added, "I insisted on the Manchester Guardian and Christian Science Monitor." It may not be far amiss to conclude that the periodicals represent adult publications of the lighter, popular type, rather than publications prepared especially for adolescents.

Suggestions for new books and other materials came from teachers, administrators, and librarians, in that order but without much difference among them. Suggestions from pupils were much less frequent.

Items about the librarian yielded the following information:

Item	Yes	No	Omitted
Have a librarian?	35	3	0
Librarian also a teacher?	32	5	1
Had training in library science?	15	23	0
Full teaching load also?	25	8	5
Students act as assistants	29	9	0

Three schools had librarians who are not also teachers. Fifteen librarians had some training in library science. Most of the teacher-librarians had a full teaching load. The number of periods in the time-table free from teaching in order to carry out library duties were:

Periods free	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
Number schools	2	0	1	0	0	0	1	0	1	0	1	3	0	1	5

Twenty-eight schools out of 38 give a brief course to their students in the use of the library. In most schools, however, the students made little scheduled use of the library. The following tabulation shows how frequently teachers sent pupils to the library for specific reference reading:

	Number of Schools	Percentage
Not at all	0	0
Very seldom	2	5.3
Occasionally	17	44.7
Frequently	13	34.2
Very frequently	5	13.1
Omitted	1	2.6

Summary

1. The typical Nova Scotian high school has six grades, VII to XII, registers 400 students, enjoys a separate library with floor space of under 1,000 square feet, provides meagrely for seating accommodation, but is equipped with adequate lighting.

2. Most of the libraries have sectional (physics, history) divisions, up-to-date card catalogues, about 1,200 books, and acquire from 50 to 75 new books per year.

3. Nearly all schools have a teacher-librarian. Forty per cent of these teachers have had some training in library science, but sixty per cent of them teach full time.

DESIGN AND STRUCTURE IN CANADIAN EDUCATION

A Comparative and Historical Study

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What is the basic design in Canadian education and the typical administrative structure which gives effect to this design? This article seeks an answer to the question by comparing both design and structure in the typical Canadian province with those of a state in the United States, and by tracing historically certain changes in provincial organization for the administration of schools. Its purpose is to achieve an increased understanding of our Canadian system of school Government.

I. CONCEPTUAL DESIGN

The conceptual design in education organized in a rational system,[1] is an expression of purposes to be achieved. It is expressed through constitutional enactments, legislative statutes, and court decisions. To be internally consistent, the design should recognize only those practices that are functionally in harmony with its avowed purposes. The design is embodied in constitutional practice, in school law, and in the existing inter-relationships among governing authorities.

Despite public unawareness of the fact, each Canadian province has it own constitution. The British North America Act and provincial statutes constitute the legal framework, but custom, usage and judicial decision provide a broader scope for legislative action.[2] Unlike its federal counterpart the province has the power to amend its constitution; each provincial legislature being in effect a constituent assembly. Sections 92 and 93, Part II of the British North America Act, constitute the legal basis for provincial sovereignty by granting to provincial legislatures plenary powers within defined limits.[3] Since provincial assemblies have the power to amend the broad phases of their written and unwritten constitutional law, it is to boundaries only that provincial legislators look for limitations to the exercise of sovereign power. To quote one authority, "every legislature in Canada acting within its

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1R. R. Hamilton and Paul D. Mort, **The Law and Public Education, p. 3.**
2R. M. Dawson, **Democratic Government in Canada, p. 103.**
3**British Statutes, 30 Victoria, c.III.**

legislative sphere is sovereign, its powers are exclusive, supreme, absolute."[4]

Provincial control over education

Control over education is awarded to the provinces in section 93 of the British North America Act as follows:

> In and for each Province the legislature may exclusively make laws in relation to Education, subject and according to the following provisions:[5]

The limitations placed on the exercise of this power are contained in the provisions designed to protect the existence of denominational or separate schools legally established by religious minorities prior to confederation. These limits have, however, been clearly defined by judicial action. While French speaking citizens may, in some provinces, claim the right to separate schools as a religious minority, they have only those privileges of language which the provincial legislature sees fit to grant.[6]

Constitutional authority of state and province compared

The clear delineation of sovereign power over education granted the Canadian province contrasts sharply with the vague historical position held by a state in the United States. The American constitution as originally drafted made no specific reference to public education as a state responsibility. With the tenth amendment allocating to the states "the powers not delegated to the United States by the constitution nor prohibited by it to the states" public education as a legal function of state government was constitutionally recognized. This late recognition of state responsibility resulted in the evolution of schools in the United States being local with the state legislature frequently asserting its control after a community school system had been established.[7] In Canada, on the other hand, provincial control of education was clearly recognized by 1850[8] and constitutionally established for all provinces in 1867 at a relatively early period in Canadian history. The evolution of education in Canada was, for this reason, largely provincial.

As noted earlier the constitutions of the Canadian provinces place no restrictions on the exercise of sovereign power over education, each provincial legislature being in itself a constituent assembly. In contrast the written constitutions of many of the United States, with amendments possible by popular ballot alone, do, in some

4R. M. Dawson: **Constitutional Issues in Canada**, p. 57.

5**British Statutes**, 30 Victoria, c.III Sec. 93.

6Peter Sandiford, **Comparative Education**, p. 378, citing Separate School Board versus Mackell. (Appeal cases 62).

7E. P. Cubberly, **Public Education in the United States**, p. 52.

8**Statutes Province of Canada**, 13 and 14 Victoria, c.48. "An Act for the Establishment and Maintenance of Common Schools in Upper Canada, 1850."

instances, restrict, not only state supremacy in education, but the exercise of any state control in many areas. Such constitutional provisions are, however, restraints on power only as the constitutions do not enumerate the powers of the state over education.[9] State and province alike may be said to enjoy sovereign power over education within the constitutional framework that grants to each its legal existence as a governing authority.

Relationships with the federal authority

Relations with the federal authority in the exercise of state or provincial sovereignty is relevent to a study of the role of the state or province in education. In Canada the British North America Act grants to the Governor General-in-Council (the federal cabinet) the general and unqualified power to disallow any provincial act within one year of its receipt in Ottawa.[10] The original intent of this provision expressed a desire on the part of the Fathers of Confederation to exercise a careful control over the enactments of provincial legislatures.[11] The struggle between federal and provincial authorities over provincial rights is an important phase of early Canadian history. Suffice it is to say that by the turn of the century, federal disallowance was rarely exercised, the courts deciding whether or not provincial legislation was "ultra vires."[12]

The power of disallowance was revived during the years 1935-1940 when the federal government felt impelled to disallow certain experiments of the Alberta legislature in the field of economic reform.[13] This revival has forced constitutional historians to re-examine the implications of federal disallowance on the full sovereignty of provincial legislatures. Undoubtedly, the exercise of a federal veto is fraught with such political significance as to cause any government to be wary in its application. Its practical importance may eventually be that an interference with the traditional rights or liberties of British subjects is sufficient reason for disallowance.[14] Reactionary legislation in the field of social welfare, including education, could, conceivably, result in direct federal interference in provincial affairs.

Federal control over education in the United States is exercised, not through the power of disallowance, but through decisions of the Supreme Court in testing the constitutionality of state legislation.

9Walter D. Cocking and Charles H. Gilmore, **Organization and Administration of Public Education, p. 22.**

10**British Statutes, 30 Victoria, c.III, sec's. 55, 56, 57.**

11Eugene Forsey, "Disallowances of Provincial Acts, Reservations of Provincial Bills and Refusal of Assent by Lieutenant Governors since 1867," **Canadian Journal of Economics and Political Science IV** (Feb., 1938) pp. 47-59.

12Dawson, Constitutional Issues of Canada, **op. cit.**, p. 59.

13Eugene Forsey, **op. cit.**, p. 58.

14**Ibid.**, p. 50.

A state must operate its educational system within the limits of the federal constitution.[15] The increase of supreme court decisions related to education since 1920 reflects the judicial extension of the meaning of the first and fourteenth amendments of the American Constitution.[16] The following quotation expresses in judicial language the basis for these decisions evidencing a growing concern for the protection of the rights of the individual guaranteed by the constitution.

> A federal court may interfere with local school authorities only when they invade either a personal liberty or property right protected by the Federal Constitution.[17]

Federal limitations of state or provincial authority, though exercised through different legal procedures, may relate to the same concern, that of protecting individual freedom during the extension of governmental activities and of regulations affecting the social and economic life of the people. No reference is made in Canada's written constitution to civil liberties but the assurance of these liberties is inherent in Canadian government. A province could not transgress Canada's unwritten constitution through discriminatory legislation for long without interference from the federal government through the machinery of disallowance.

Relationship to local authorities

The British North America Act under section 92 awards provincial legislatures exclusive powers over "municipal institutions" and matters of "merely local or private nature" with the result that all local government derives its legal function from provincial authority.[18] Canadian provinces without exception have established special governing bodies locally in some form or another to administer education.[19] The nature of local responsibility in education was developed through legislation in Upper Canada which has served as a general pattern for all Canadian provinces with the exception of Quebec and Newfoundland.[20] Local educational authorities exercise this jurisdiction over schools by authority of the provincial legislature. They are, in reality, administrative agents for effecting provincial control of education.

While the relationship of central to local government was clearly defined early in the history of Canadian education, this has not been equally true in the school systems of the United States. Historically

15 Ward Keesecker, "Supreme Court Decisions Affecting Education," School Life XXXI (February, 1949), p. 4.

16 Ibid., p. 5.

17 Ibid., p. 5, citing Jackson (659 ct. 461, 1948) McCallum V., Board of Education.

18 R. M. Dawson, op. cit., p. 116.

19 Ibid., p. 118.

20 Report of the Royal Commission on Education in Ontario, Province of Ontario, 1920, p. 195.

education in most states grew up under local control, any functions performed by the state agency being chiefly clerical and statistical.[21] Supreme court decisions have, however, clarified state relationships with local districts, bringing the role of the central agency more sharply in focus. The decision of the Supreme Court of Indiana established that "it is for the law making body to determine whether authority over education shall be exercised by a state board of education or distributed to county, township or city organizations throughout the state . . ."[22] Ostensibly state control may be limited or negligible; nonetheless, local educational authorities are, in reality, state agents and are ultimately responsible to the state.[23] Nor, as has been pointed out by Keesecker in the following quotation, does the state necessarily share its power with local units.

> The authority over education has been held by the courts to be not necessarily a distributive one, to be exercised by local instrumentalities; but on the contrary a central power residing in the legislature of the state.[24]

In both province and state according to these observations the ultimate decisions affecting the control of schools lie within the prerogatives of provincial and state legislatures. These bodies may exercise their constitutional power to reorganize the structures of school government, to increase or decrease local responsibility, or to eliminate it completely, creating a system administered directly by the central authority. While tradition and custom combine to protect the integrity of local school government, its existence is dependent upon, and its authority stems from, the legislative branch of state or provincial government.

Federal decentralization

A further characteristic common to the public school system of Canada and the United States is that of federal decentralization. In both countries the provincial or state authority is accountable to "no superior tribunal in directing the course of education or for its failure to provide an adequate or uniform system of schools."[25] The right of a government to exercise this power is sometimes said to be derived from its police power, at other times "the inherent power of sovereignty to promote the welfare and happiness of the people of the state."[26] Irrespective of its source, the constitutional authority of the state and province is plenary and unquestioned.

21Fred F. Beach, "The Functions of the State Department of Education," **Bulletin No. 12,** (Washington, D.C., U.S. Office of Education, Government Printing Office, 1950), p. 1.

22Ward Keesecker, **op. cit.,** p. 4, citing Supreme Court of Indiana (23 N.E. 946).

23Cocking and Gilmore, **op. cit.,** p. 9.

24Ward W. Keesecker, "Legislation as it Affects State School Administration, Principal Trends Across the Nation during the Past Decade," **School Life,** XXXII (May, 1950), p. 122.

25Hamilton and Mort, **op. cit.,** p. 9.

26**Ibid.,** p. 24.

This sovereignty of the individual state or province gives to the school system in Canada and the United States a flexibility which permits experimentation in public education without risk of damage to the entire nation. As Judge Brandeis remarked, this feature, unique to federal decentralization, makes possible novel social and economic experiments in the broad field of public welfare.[27] The conceptual design of education in both countries, while drawing its inspiration from federalism, grants sovereign power to the governments which are close to the people and capable legally of expressing the public will.

II. THE STRUCTURES OF SCHOOL ADMINISTRATION

While the conceptual design of public education in Canada and the United States is similar, the structural patterns which give effect to this common design reveal certain significant differences. As governmental organization determines the means by which legislation is made effective, the structures of government become the starting point in any comparative study of school administration. Methods of school control in public education grow from the political context reflecting basic procedures in constitutional practice.

Governmental structures in the Canadian provinces are, without exception, modelled on English law and practice.[28] The lieutenant governor performing certain symbolic functions is the ostensible head of provincial government. Executive power rests, however, with the premier and his cabinet, a body responsible to an elected legislature. The distinguishing characteristics of parliamentary or responsible government are revealed through the concentration of executive and administrative power in the cabinet membership and through a close coordination of the executive and legislative branches of government.

The founders of state government, on the other hand, avoided centralized administration, concentrating on the separation of executive and legislative powers.[29] De Tocqueville, in his shrewd analysis of American government, pointed out that the state governor represented executive power but enjoyed only a portion of its rights.[30] Non-parliamentary government, stressing the dispersion of executive authority has tended to decentralize administration, creating a multiplicy of agencies for giving effect to legislative authority.[31]

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27 Ward W. Keesecker, "Know Your School Law," **Bulletin, 1952, No. 4** (Washington: U.S. Office of Education, Government Printing Office), p. 4.
28 Dawson, Democratic Government in Canada, **op. cit., p. 102.**
29 Walter Cocking and Charles Gilmore, **op. cit.**, p. 40.
30 **Michigan Joint Legislative Committee on Reorganization of State Government** (Lansing: General Management of Michigan State Government, No. 1951, p. 1.
31 Cocking and Gilmore, **op. cit.**, p. 40.

The centralization of educational control in the provincial cabinet was inevitable in the history of Canadian education. One illustration, typical of others, drawn from the history of the provinces, bears this out. The Council of Public Instruction, an independent administrative board established by the School Act of 1850, had been delegated authority from the legislature of the Province of Canada to administer school law for Upper Canada. Further legislation in 1874 changed the character of the provincial board by introducing the elective principle for membership, and by granting it enhanced authority through the prescription of provincial courses of study and the appointment of high school inspectors.[32] Within two years, however, the Ontario legislature acting upon Ryerson's recommendation enacted legislation to transfer "all the powers and duties which the said council now possesses or may exercise by virtue of any statute on that behalf" to the "Education Department which shall consist of the Executive Council or a committee thereof appointed by the Lieutenant Governer."[33]

The increasing friction of the post-confederation period between the provincial cabinet and the Council of Public Instruction, with criticism focusing on Chief Superintendent Ryerson as the dominant force in the education board, illustrates effectively the incompatability of multiple administrative agencies under parliamentary government.[34] The provincial treasurer interfered with the financial administration of the education office[35] while the cabinet as a whole acquired statutory powers to review the decisions of both the Chief Superintendent and the Council of Public Instruction.[36] Chief Superintendent Ryerson, in protecting his legislative program, campaigned unsuccessfully to prevent the election of his severest critic, Arthur Blake, leader of the Liberal party, thereby weakening the strongest argument for the unique or separate control of education—that of political independence.[37]

Ryerson's recommendation for a change in the provincial structures of control may have stemmed from a belated recognition that the cabinet's jealous concern for its constitutional prerogative of complete executive authority made the existence of a separate administrative agency for education no longer tenable. It more likely

32**Statutes of Ontario,** 37 Victoria, c. 27, part I. "An Act to Amend and Consolidate the Law Relating to the Council of Public Instruction, 1874."

33**Statutes of Ontario,** 39 Victoria, c. 26, sec. 1, "An Act Respecting the Education Department."

34J. G. Hodgins, **Documentary History of Education in Upper Canada** Vol. 26, Chap. III, citing "Correspondence between Attorney General Mowat and the Chief Superintendent of Education, 1874."

35Shortt and Doughty, **Canada and Its Provinces,** Vol. 18, pp. 318-319.

36**Statutes of Ontario,** 35 Victoria, c. 30, "An Act to Make Temporary Provision as to the Regulation of the Council of Public Instruction 1872."

37Shortt and Doughty, **loc. cit.,** p. 319.

grew from his irritation over the obstructionist tactics followed by the newly elected members of the council who apparently opposed him in the development of council policy.[38] His recommendation was finally acted upon in 1876 when premier Alexander Mowat became fully persuaded that the province was ready to accept the administration of schools by a regularly organized government department. The result was the statutory enactment, referred to earlier, transferring the powers of the Council of Public Instruction to the Executive Council with a member of that body acting as Minister of Education.

Administrative boards for school government independent of the provincial cabinet have met similar fates throughout the Canadian provinces.[39] Miller, in a survey of Canadian education in 1913 indicated that advisory councils with membership distinct from the cabinet existed in at least five of the nine provinces but that the powers of these councils were largely nominal as far as school administration was concerned.[40] A more recent study revealed that four only of the ten provinces (Quebec, Manitoba, Prince Edward Island, and Newfoundland) make reference to these vestiges of semi-independent central authorities, and then largely as media for securing public opinion.[41] In the Canadian system of education the provincial cabinet has become, in the complete meaning of the term, the provincial board of education.

Province and state compared

The centralization of school control in the provincial cabinet emphasizes a major difference between the structures for educational administration in a Canadian province and in an American state. The state board of education in the United States had, by the middle of the nineteenth century, been transformed from an advisory board to one exercising a broad type of legislative and executive responsibility.[42] Since that time, forty of the forty-eight states have established state boards of education through constitutional or statutory provisions.[43] Any direct control exercised by the governor, the chief executive officer of the state, over the state board of

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38Hodgins, **op. cit.**, Vol. 25, p. IV.

39A similar centralization of authority, though for different reasons occurred in the North West Territories when the powers of the independent Board of Education were transferred to the Executive Committee of the Legislative Assembly, later to the Executive Council. See **Ordinances Northwest Territories** 1901, c. 29.

40James C. Miller, **Rural School in Canada—Their Organization, Administration and Supervision**, pp. 1-3.

41Canadian Bureau of Statistics, **The Organization and Administration of Public Schools in Canada, et passim.**

42Ellwood Cubberly, **State School Administration**, p. 294.

43Ward A. Keesecker, "State Boards of Education and Chief State School Officers," **Bulletin** 1950, No. 12 (Washington: United States Office of Education, Government Printing Office, 1950), Table 2, p. 11.

education, derives from his power to appoint its membership, wholly or in part. This authority exists in twenty-nine of the forty states with central boards.[44] The trend, however, is towards an elected rather than an appointed board with the governor being excluded from ex-officio membership.[45] Conflicting viewpoints exist as to the desirability of such a trend. The independently elected board, with responsibility for appointing its executive head, is favored by many educators. A more closely integrated control of all state administration by the governor receives the support generally of political scientists in their studies on state government.[46]

That education, through tradition and practice, should occupy a unique and independent position distinct from the general administration of state affairs is basic in the administrative structures of most state school systems.[47] Certain authorities on state government consider education to be a fourth department in addition to the legislative, judicial, and executive functions of government.[48] Recent studies on state leadership emphasize that the administration of education as a unique function of government is essential for its protection against partisan politics, and for the assurance of effective state programs for school improvement.[49]

By contrast education in the Canadian provinces occupies a position in provincial administration similar to that held by other government services. It is under the control of a cabinet whose existence depends on the political process and is influenced by all the pressures deriving from party conflict for popular support. The government department responsible for education bears the same relationship to the cabinet as do the departments dealing with the administration of public works, health, municipal affairs, highways, welfare, and agriculture. Provincial educational officials are civil servants subject to the same regulations for appointment and dismissal as apply to the civil service generally. The protection of education against political interference is bound up with the status of the civil service and is dependent, not on an administrative structure, but on tradition and practice in the provincial administration of schools. Education in Canada is not, nor has it been for many years, a unique function of government provincially nor does any pressure exist on the part of interested groups to make it so.

44**Ibid.**, p. 12.

45**Ibid.**, p. 9.

46E. L. Morphet, "Relationship of Education to Government, " **44 Yearbook.** National Society for the Study of Education, Part II, p. 1-54.

47**Ibid.**, p. 156.

48John R. Mathews, **American State Government**, p. 169.

49Educational Policies Commission, **Education for All American Youth, A Further Look**, p. 319.

The Chief administrative officer

The concept of an appointed chief school officer independent of political change and controversy is not unknown in the history of Canadian education. The United Province of Canada had, shortly after its establishment, made provision for such an official with specific regulatory and supervisory functions.[50] Ryerson's leadership in the office of Superintendent of Education for Upper Canada from 1846-1876 exerted a major influence on the Canadian patterns of school control. As a member of the Board of Public Instruction and as its chief administrative officer, he was responsible for the development and direction of school policy. He was, in effect, the dominant force in public education in Upper Canada for a period of thirty years. The school act of 1876, however, abolished the office held by Ryerson, placing the administration of the newly formed Department of Education under the leadership of a cabinet minister directly responsible to the Legislative Assembly.[51]

This development from the educational history of Ontario, illustrating the evolutionary process by which the office of chief school administrator became, in effect, political, is representative of a national trend.[52] A distinguishing characteristic of Canadian education is the uniformity of design in the structures developed by the provinces for the central administration of schools. With the exception of Quebec, which retains as tituler head of the department the Superintendent of Education, all provinces have ministers of education in charge of government departments[53] which exercise leadership over the provincial systems.

A comparison of chief executive officers in state and province

The position of chief executive officer in the state administration of schools has points both of similarity and difference to the office of minister of education in the Canadian province. Historically, the two offices have much in common. The first state to provide for the appointment of a chief state school officer was New York in 1812 in an act stating "that there shall be constituted an office within the state, known and distinguished as the superintendent of common schools, which superintendent shall be appointed by the council of appointment," whose duty shall be "to digest and prepare plans for the improvement and management of the common school fund, and for the better organization of the common schools.[54] The first

50**Statutes, Province of Canada,** 4 and 5 Victoria, c. 18.

51**Statutes of Ontario,** 39 Victoria, c. 26.

52The North West Territories had a Superintendent of Education from 1892 to 1901 who was replaced at that time by a cabinent minister.

53Dominion Bureau of Statistics, **op. cit.,** p. 9.

54Keesecker, **op. cit.,** p. 23 citing "The New York Act, June 12, 1812."

reference in Canadian legislation to the office of chief superintendent occurred in 1841 when the Legislature of the Province of Canada enacted "that it shall be lawful for the Governor of this Province, by letters patent under the Great Seal thereof, to appoint from time to time, one fit and proper person to be Superintendent of Education in this Province." The duties of this official as set out in the act were "to apportion in each and every year, the money annually granted by the legislature as aforesaid, among the several municipal districts in the province and ascertain the state of the Common schools therein."[55] In both state and province the major concern of these early officials was the administration of the common school fund and the general oversight of the common schools.

The position of chief state school officer has been provided for either by the state constitution or by legislative enactment in all of the forty-eight states. Thirty-three of the states make constitutional provision for a state school officer in the articles dealing with either the executive departments or education such as follows:

> The executive Department of this commonwealth shall consist of a Governor, Lieutenant Governor, Secretary of the Commonwealth, Attorney General, State Treasurer, Secretary of Internal Affairs and a Superintendent of Public Instruction.[56]

The legislature of the Canadian province, on the other hand, is under no such constitutional obligation to provide an executive officer for schools but has done so typically by statute: "There shall be a department of the public service . . . over which the member of the Executive Council appointed by the Lieutenant-Governor in Council . . . to discharge the functions of the Minister of Education for the time being shall preside."[57]

The chief school officer in the United States secures his position by one of three methods: He is appointed by the governor in six states, elected directly by the people in thirty states, and appointed by the state boards of education in twelve states.[58] The trend is towards appointment by an elected state board but, so far, this movement has not affected materially the predominant practice of electing the state administrator of schools by popular ballot.[59]

The state school officer appointed by the governor of the state presumably has a responsibility to him comparable to that held by the minister of education to the premier of the province. A state school officer so appointed is, in effect, a member of the governor's

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55 **Statutes, Province of Canada,** 4 and 5 Victoria, c. 18.

56 Keesecker, **op. cit.,** pp. 28-29, citing the "Constitution of Pennsylvania, Art. IV, Sec. I."

57 **Statutes of Alberta, 1901** and Amendments, c. 29, sec. 3. "The School Ordinance."

58 Keesecker, **op. cit.,** p. 34.

59 **Ibid., p. 32.**

cabinet. He does not, however, have the direct responsibility to the legislature which the minister of education in the Canadian province must always accept.

The elected chief state school officer, while unquestionably an administrative officer of the state, is by virtue of direct election in some degree removed from the control of the legislative and executive branches of government.[60] The power to make and to interpret regulations for school control accords him both legislative and quasi-judicial functions comparable to those exercised by a Canadian minister.[61] The state officer draws these powers either from constitutional provisions indicating the relationships between the legislature and administrative branches of government or from statutes of the legislature, and he exercises them in direct responsibility to the people. The provincial minister, on the other hand, is responsible only to the Legislative Assembly for his exercise of the policy-making function and for his performance of the ministerial duty.

The appointment of the chief executive officer by an elected state board of education marks the widest divergence in practice between province and state. The attempt to separate policy-making from the ministerial function, to professionalize the office and remove it from the arena of party politics places it in sharp contrast to the Canadian ministry with its politically appointed incumbent. A comparable office in Canadian school administration is that of deputy minister who, as permanent head of a department of education, provides continuity of control, technical training, and non-political leadership. The deputy is not, however, the chief administrative officer of the provincial school system but the advisor to the minister in whose name he exercises leadership over the schools of the province.

Similarities in the office of the chief school administrator in province and state grow from a common conceptual design in the school systems of the two nations. The autonomy over education vested in state and provincial legislatures creates the need for a central administrative agency with wide powers of control. Such an executive, to achieve the necessary flexibility in administration, must possess discretionary powers that imply both policy-making and quasi-judicial functions. These have been granted in most instances to the chief school officer in both province and state. The differences in the office derive from dissimilar constitutional procedures for defining relationships between the legislative and executive branches of government. The direct election of the chief

60Cocking and Gilmore, op. cit., pp. 43-44.
61Hamilton and Mort, op. cit., p. 60.

school administrator, while common in the United States, is unheard of in Canada. Further, the trend to develop an elected state board with an executive officer whose chief function is ministerial, contrasts sharply with the Canadian practice of responsible government involving a minister exercising through his department the wide powers concomitant with the principle of cabinet solidarity.

The Department of Education

The departments of education in Canada are regularly part of the provincial civil service charged with the responsibility of administering the statutory enactments of the legislature as they apply to schools. With one exception (Quebec) Canadian departments are presided over by a cabinent minister and are, in effect, an extension of his executive function. They draw their powers from his office, exercising them in his name and acting under his responsibility.[62] In short, the department of education in Canada has actually no powers apart from those accorded the minister by the legislature of the province.

A distinguishing characteristic of Canadian departments of education is the degree of uniformity that exists in their internal organization. While the allocation of specific functions to the various branches may vary, the broad divisions in the ten departments are basically similar. The emphasis placed on the central control of interna, a legacy of the Ryersonian period, has resulted in large staffs concerned with the inspection and supervision of classroom instruction. Curriculum planning, traditionally an expression of provincial administration, has, of recent years, become so involved that many provinces have set up separate branches for the development of provincial courses of study. New movements in education bearing directly on instruction, such as guidance, make their impact on Canadian schools through the establishment of directorates within the provincial departments. The traditions of provincial leadership, combined with an early acceptance of the constitutional responsibility of the province for education, have created central agencies whose leadership functions and administrative structures tend to follow a national pattern.

A comparison of function with state departments of education

The Canadian department of education exists to assist the responsible cabinet member in the performance of his ministerial function. The state department serves a similar purpose for the chief school officer of the United States. As in Canada, the education department consists of a selected corps of employees

[62]Dominion Bureau of Statistics, op. cit., p. 17.

charged with the responsibility for assisting the chief executive of public schools in giving effect to the school law developed by the state legislature. As the concept of functions for the central agency broadened from the statistical or recording stage through the inspectoral to the present stage emphasizing state leadership, the personnel needs of the department expanded accordingly.[63] Similarly to Canadian development the internal structures and major functions of the state department grew from the evolving concepts of the central agency's role in the total design of public education.

The functions of state and provincial departments in the field of instruction have followed similar patterns of development. A need for the regulation of secondary education led both state and provincial administrative agencies to appoint departmental officials for the inspection of higher schools. Active supervision by the central agency in both province and state started at the top of the school system. Provincial and state legislatures in both countries experimented with statutory curriculum control, a method of program planning which was ultimately to prove unsuccessful. Like its Canadian counterpart, the state department has established legally its leadership role in curriculum building and in supervision, the success of its performance in these areas being dependent on personnel. That many state departments have not expanded staffs sufficiently to provide the most effective type of leadership is, in the opinion of competent authorities, a matter of regret.[64]

CONCLUSIONS

1. The province's authority over education vested in the legislature is plenary, any constitutional limitations to this power being restrictive only.

2. Local school agencies operate by virtue of the power granted them by the provincial legislature; they are, in effect, the province at work locally.

3. The conceptual design in Canadian education involving provincial autonomy, federal decentralization, and free public education is similar to that of the United States.

4. The administrative structures in Canadian education are concomitants of cabinet government with a minister of the crown, a political figure, serving as chief executive officer of the provincial school system.

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[63]Fred F. Beach and Andrew H. Gibbs, "The Personnel of State Departments of Education," Misc. No. 16 (Washington: U.S. Office of Education, Government Printing Office, 1952), p. 3.

[64]American Association of School Administration, "The American School Superintendency," 30th Year Book, p. 339.

5. The differences in administrative structures between province and state grow from the basic differences in relationships between the legislative and executive branches of government typical of parliamentary and non-parliamentary forms of government.

6. The legal functions of the department of education with respect to instructional leadership typical of the Canadian province are generally those acquired by the state agency in the United States.

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THE DRUMMER

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Spring in the Canadian woods is ushered in by one of the most thrilling sounds that can be heard in the great outdoors. This is the season when the Ruffed grouse (*Bonasa umbellus*) sends from his mossy log those matchless reverberating throbs which announce that winter has had his sway and must yield, yet once again, to the most delightful season of the year.

I say 'Canadian woods' advisedly since, though of very restricted territory and non-migratory in habit, the Ruffed grouse is one of Canada's most widely distributed birds. This species occurs in wooded areas from the shores of the Pacific to those of the Atlantic and from our southern-most border to the tree limit in the north. It seems safe, therefore, to say that untold thousands of people have quickened to his stirring beat. The literature of the outdoors is replete with reference to the miniature thunder which rolls through our woods when once again the warm sun begins to assert its authority.

Myriad are the theories which have been advanced to explain the mechanics responsible for the remarkable thumping sounds produced by the cock of the species. Some have contended that the bird strikes the breast feathers forcibly, each successive stroke initiating a resultant thump. Others have advanced the idea that the sound results from the wings striking together physically, either behind the back or in front of the breast. People who have only heard the sounds but not witnessed their generation are apt to suggest that the bird mounts his log and proceeds to strike his wings against it. There are undoubtedly several reasons for this lack of concurrence. Many of the observers have viewed the spectacle from a distance and few have had sufficiently sensitive film or high-speed lenses capable of recording the event. Even those fortunate enough to observe the phenomenon at arm's length have found the wing-beat so powerful and swift as almost to defy the eye in following the finest details. Today, with a modicum of patience and at little expense, naturists may both observe and photograph this fascinating phenomenon at close range.

One must first locate a drumming bird. At present this is a relatively simple task since the population cycle is on the up-surge. Although the species beats pretty well throughout the day, the performance appears to peak in the early morning and again in the evening. In our latitudes, April and May are the most fruitful

months to attend this singular musician. Although the throbbing sound carries easily for half a mile, it has a distinctly ventriloquial quality which often makes it difficult to ascertain the exact direction from whence it comes. A little care and patience will overcome this difficulty. If you proceed with caution and alterness when the bird is busily engaged, you stand a fair chance of discovering him upon his favourite log. However, remember that shyer individuals are apt to slip soundlessly from their thrones at your approach—mute evidence of alarm. When this occurs, one has but to search the vicinity, carefully examining every windfall. At length the drumming log will be discovered—usually a fallen monarch of the woods, richly moss-grown except for a single bare patch much worn from recent use. Additional evidence of the presence of drummers is supplied by the abundance of greyish-white droppings on either side of the log.

For purposes of close observation and photography, a blind is indispensable. This is a simple and portable structure which anyone can construct at small outlay. Purchase ten yards of light-weight canvas and four dowels each about six feet in length and an inch in diameter. Cut the ten-yard length of canvas exactly in half and cross the resultant halves at right angles, the whole forming a sort of maltese cross. Run a seam around the square at the centre, stitch the adjacent free edges firmly together, cut observation slits in the sides and your blind is ready for use. The time and effort so involved may be the most fruitful ever expended.

Initially, the blind should be erected at some dozen yards from the drumming log and left there for two or three days until the bird accepts it as a normal part of the environment. At the end of such time, it may be moved closer, say half the distance to the log. The final move which may be made a day or two later might well bring the blind to within four feet of the drumming site. Be sure to check light direction and remove offending branches if photography is anticipated.

It is best to occupy the blind alone as even slight noises may alarm the returning bird so that your tenancy is unrewarded. Either enter it very early in the morning before the sky has lightened or have a companion serve as escort. In the latter case, both parties should enter and remain until the photographer has set up his equipment and focussed on the exact area used by the drummer. When all is in readiness, the companion should leave as conspicuously as possible. It is well to equip the blind with a comfortable stool such as an old nail key as at times the wait is somewhat protracted. A sandwich and a thermos of hot coffee prove most welcome on cooler mornings.

You are about to have a thrilling experience. Keep your ear finely attuned, as the drummer always announces his return with a swift rustle of leaves as he hurries directly to the drumming log. With a light leap, he mounts and struts warily to the accustomed spot, his whole mein suggestive of extreme circumspection. His golden eye carefully inspects every point of the compass as though to pierce the depths of the woods for hidden danger. Apparently reassured, he sets his toes firmly into the worn area slightly forward of the summit, erects his crest and flattens his magnificent fan, spread broadly upon the surface of the log. At the first powerful stroke of the wings, he assumes a more erect posture as though driven upward by the forces released. A resounding explosive thump follows immediately upon the wing beat, although so swiftly do the wings return to trailing position at the sides that details are almost imperceptible. And now the wings move forward and upward in complete unison increasing in tempo until they become but a blur, the individual thumps coming faster and faster until at length they blend in a steady roar. Throughout, the head is held absolutely motionless while the breast feathers are visibly parted, horizontally, by the release of the compressed air responsible for the resounding thumps. At the conclusion of the drumming, the cock pitches slightly forward, raising his partially spread tail and puffing out his breast feathers in a great rounded cushion. Checking one's watch, one notes with astonishment that the entire performance has consumed scarcely eight seconds. Eight seconds during which one scarcely dared breathe.

Nor is your drummer loath to provide you with an encore. A score of repetitions allows you to analyse the details. The thumps become definitely associated with the forward stroke of the wings and the resultant compression of the air. Each time the performance is exactly as before. Only the first few and the very last strokes can be at all clearly followed. High speed "strobe-light" alone is capable of 'freezing' the exact details upon sensitive film. Only then do you become aware of the extent of the backward sweep of the wings, the exquisite symmetrical spread of primaries, the great cupped bow of the wingtips as they sweep forward and upward compressing the air between the wings and body.

Only after your drummer has left his vantage point to forage for food do you breathe naturally again. Thereafter, when woods turn to pale misty green and muffled thunder echoes throughout their depths, you will pause and wonder. In your mind's eye, you will reconstruct the event. Once again, your first drummer will mount his mossy log and drum his defiance to all rivals in the areas as he stakes out his claim to his territory.

THE NATIONAL FOUNDATION FOR EDUCATIONAL RESEARCH IN ENGLAND AND WALES

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Educational research in England and Wales remained a function of the universities and local authorities long after the Scottish Council for Research in Education had come into existence in 1928. Prior to the outbreak of the second great war a committee, originally set up to supervise the Carnegie Corporation enquiry into scholastic examinations in England and Wales, became convinced of the need for a national research organization. It secured an award of $10,000.00 for this purpose from the Carnegie Corporation on the understanding that a similar amount would be raised in England. It was understood that the fund should be administered by the Institute of Education of the University of London, acting on the advice of an Advisory Council representing the main interests concerned with education in England and Wales. After much delay occasioned by the war the Advisory Council met in January, 1943, under the chairmanship of Sir Fred Clarke. It approved the organization of the Foundation for Educational Research as a 'representative and autonomous body' for the planning and prosecution of research in cooperation with the research staff of the Institute of Education. A full time secretary was appointed in 1944. Generous donations were received from the Leverhulme Trust, the National Union of Teachers, and other bodies. Under the Education Act of 1944 power was granted to local education authorities to provide funds for research purposes.

In December 1945 a conference was called at which representatives were present from the universities, local education authorities, national associations of teachers and the original Advisory Committee. At this meeting the National Foundation for Research in Education in England and Wales was formally organized on an non-profit basis with corporate memberships for the universities, educational authorities and teachers' association. Individual memberships were open to persons interested in education. The council of the Foundation was to be fully representative of the corporate membership, and to include representatives of the Ministry of Education and co-opted individual members. Its functions were as follows:

1. to conduct, or assist in the conduct of, research and the publication of findings,
2. to act in liaison with international bodies interested in research,

3. to act in liaison with other national research bodies,
4. to act in an advisory capacity with the Ministry of Education in matters of research, and
5. to act as a means of interchange of educational ideas.

The conference authorized an executive committee to proceed with the organization of the National Foundation For Educational Research. Provision was also made for the establishment of a Welsh section to deal with matters pertaining to educational research in Wales.

In April 1947 the Foundation became an entirely separate and self-governing organization and assumed complete control over its own finances, which had, to this point, been managed by the Institute of Education. A constitution was adopted which was in harmony with the wishes expressed by the conference of 1945.

Permanent quarters were secured in 1946 on Wimpole Street. A lease of the property for 999 years was purchased with money loaned by the National Union of Teachers.

The financial arrangements of the Foundation were soon placed on a satisfactory basis. In the year of 1948, the first year for which an annual statement is immediately available, income reached the level of £12,076; coming mainly from contributions of corporate members, local educational authorities, universities, national association of teachers, and a grant from the Ministry of Education based on an assessment of the present and proposed program of the Foundation. The 1956 annual statement reveals income from grants and subscriptions of approximately £21,000. It is important to note that notwithstanding the amount of individual contributions no organization nor body has the authority to interfere with the autonomy of the Foundation.

The research program commenced while the organization of the Foundation was still in progress. Three principles of operation were accepted early in its history.

First—that most worthwhile research undertakings are of three to four year's duration.

Second—that for each approved research project an advisory committee must be created from representatives of the universities, the local education authorities, the teachers, and the Ministry of Education, all having special knowledge of the problem under study.

Third—where possible a competent scholar be appointed as research officer in charge of each project. This usually entails the temporary release of the appointee on leave of

absence from his normal occupation for the period required for completion of the study.

A brief summary of research follows. Not pretending to be complete, it is limited to the period ending in March, 1956.

Cumulative Records for School Pupils One of the earliest activities of the Foundation was the development of a set of cumulative records and explanatory booklets on three levels: the School Record (Infant), the School Record (Junior), the School Record (Secondary). These individual records have been widely purchased by local educational authorities.

The Use of Visual Aids in Education A questionnaire study of the use of visual aids was completed and the results circulated among educationalists of England and Wales. Three short term investigations were then authorized involving the utility of films and film strips in the schools.

The Use of Rewards and Punishments in the Schools A pilot study of this problem was so successful that it was duplicated on a much larger scale in England and Wales. Cooperation of guidance clinics, remedial education centres and staffs of schools for the maladjusted was obtained. Studies were also launched into the relative frequency of certain types of misdemeanors and the attitude of educationalists toward the use of corporal punishment in the schools. Sociological and administrative aspects of the problem have also been studied.

The Stead Memorial Research into the Content and Method of the Modern Secondary School This was a study conducted in four modern secondary schools. It is available in published form.

Problems Distinctive of Educational Life in Wales This study resulted in the preparation of bilingual pupil records for infant, primary and secondary schools. It is too early to report on experience of their use.

Dr. Jenkins' Non-Verbal Test of Mental Ability The Foundation produced a test of non-verbal intelligence from the late Dr. Jenkins' materials, involving responses to five different forms of logical thinking. It was standardized and norms developed, and then was made available to the schools. A similar test has been produced for use in secondary schools.

"List of Researches in Education and Psychology Presented for Higher Degrees in the Universities of the United Kingdom, Northern Ireland, and the Irish Republic from 1918 to 1948" Mrs. A. M. Blackwell. Since 1948 two supplements have appeared making the list complete to the end of 1955.

Allocation of Primary School Leavers to Appropriate Secondary School Courses An interim report on this, the largest Foundation project to date (1950) has been published. It reports on the use of non-verbal tests in primary school and the differences in results of non-verbal and verbal tests. Futher studies of a 'follow-up' nature have been made of the relation of these differences to later achievement. A large scale study is also being made of the part which objective tests can play in the prediction of later achievement when used in courses for primary school leavers. A further study will be made of the effects of such qualities as intellect and character and of environmental influences upon school achievement.

Educability of Children Suffering from Spastic Paralysis This study was completed in 1950. It provides an improved procedure for classification of spastic children. The discussion of their range of capacities and of appropriate educational provision for their needs is a contribution to educational practice.

Intelligence Tests For Blind Children The adaptation of an individual intelligence test for use with blind children aged from four to sixteen years permitted an examination of over 1,000 cases. Clear differences have been revealed between the totally blind and the partially sighted, with the blind superior on verbal tests and the partially sighted better in performance. Further studies are in progress.

The Respective Merits of Greek and Latin as the Basis of the Classical Type of Education This was one of the earlier studies of the Foundation. It sought to compare the effects of the two languages on the capacity of grammar school pupils to think clearly about current affairs. As the results were somewhat inconclusive the report has been filed for reference.

The Twickenham Studies Arising out of the earlier studies of allocation of primary school leavers, a follow-up study was made of 1,500 pupils leaving primary school in 1951, and a similar group leaving in 1952. There was also a follow-back of pupils already in secondary school who were doing work which was markedly superior or inferior to that expected from their previous educational records. A more extensive study is to be made of 250 of the 1951 primary school leavers. Further studies are in progress.

The Effects of Coaching on Test Results This study suggests that the effects of coaching for grammar school entrance examinations may have been seriously underestimated.

National Surveys of Ability and Attainment This is a cooperative study from which interesting results may be expected in 1957.

National Survey of General Ability and Attainment in Reading and Arithmetic at 7 plus, 10 plus and 14 plus This is a survey at three levels of the relationship between general ability and attainment in the basic skills. It is being pursued with specially constructed tests in a sampling of pupils throughout England and Wales.

For the information of students of research it is to be noted that, unlike its Scottish counterpart, the British Foundation has accepted an important role in test construction since the formation of a Tests Division in 1950. Since that time five standard batteries of tests, Verbal, English, and Arithmetic, have been developed for allocation purposes at the age range of 10.00 to 11.11. Verbal and non-verbal tests of general ability have been produced for primary and secondary schools as well as tests of spatial and clerical capacity. In addition the Foundation acts as sole agent in the United Kingdom for the tests produced by the Psychological Corporation of America, and by the Australian Council for Educational Research.

Another feature of the development of the Foundation has been the discovery that a research library is vital to the efficient pursuit of the research program. Early in its history, when this point was conceded, an adequate library of references and journals was planned and, by degrees, has been achieved. This, together with a library of testing instruments, proves a valuable aid to the research officers in charge of ongoing projects.

A summary of the principles and practices of the National Foundation for Educational Research in England and Wales will focus attention on a number of matters which are of importance to similar organizations in Canada.

1. **The autonomy of the Foundation** Despite direct contributions from the universities, local educational authorities, teachers organizations and other bodies, no direct influence may be exerted by any group upon the program and activities of the Foundation.

2. **The Search for Appropriate Research Problems** The search for suitable and timely research problems may be illustrated by a conference held in 1954. Fifty-four individuals interested in problems of selection of students for secondary education were drawn from the universities, departments of education, inspectors of schools, administrators, head masters and teachers' associations. The conference located problem areas, set up 'working parties' to explore two major problems, and generally advanced toward a position where major studies might be initiated.

3. **The Length of the Average Study** There was early acceptance of the fact that suitable research projects would take from three to four years for completion.

4. **Research Advisory Committees** The practice was established of appointing an advisory committee for each research project, composed usually of representatives of the universities, local education authorities, the teachers and the Ministry who have special knowledge of the problem under study.

5. **The Appointment of Research Officers** Where possible a competent research officer is appointed to head each research project. This necessitates the securing of leave of absence for full time direction of the study. The practice assures continuous direction and control and reduces waste, delay and inefficiency.

6. **The Tests Division** Contrary to Scottish policy the Foundation discovered a need for British tests with British norms, and information about testing generally. They have established an extremely active division to serve these needs. They also represent an American test organization and the test division of the Australian Council on Educational Research.

7. **The Research Library** Experience revealed that an extensive research library was vital to the conduct of research and the construction of tests. Since its cost is small in relation to expenditures on major projects it must almost be regarded as a necessity in any effective research organization.

8. **Financial Support for Research** The practice of local education authorities making grants to the Foundation in terms of the number of pupils in attendance was written into the first Constitution. This arrangement permits the council to anticipate income and budget more precisely than would otherwise be the case.

The strength of the National Foundation seems to rest in its autonomy and the adequacy of its financing. Probably more important is the genuine acceptance of its importance by Ministry, universities, local education authorities, and teachers organizations, an acceptance which is evident both in the amount of financial aid granted and in the seconding of valuable scholars for temporary service on Foundation projects. Of significance also is the fact that the selection of projects is made in terms of the needs of the educational system as revealed spontaneously or in answer to systematic search conducted by the Foundation.

BOOK REVIEW

CRESTWOOD HEIGHTS: A NORTH AMERICAN SUBURB by John R. Seely, R. Alexander Sim, and Elizabeth W. Loosley. Toronto: University of Toronto Press, 1956, pp. 505. $6.50.

If you are interested in a living, moving panorama of existence in an upper-class Canadian community you will find it in **Crestwood Heights.** This community, about forty per cent Jewish, and appreciably wealthy, occupies a small but elevated section in one of Canada's largest cities. The men carry on their business and professional activities mainly in the big city below; the women adorn and dominate their homes on the heights; the children attend and are absorbed by the schools.

In a society, competitive, with steadily rising standards, with no comfortable traditions, family fortunes run with the father's income. He must keep to the treadmill, improve his position as may be, but continuously produce wealth. Relaxation, recreation, avocation, if essential, are still secondary. There is no standing still. The mother, rather less from preference than from paternal abdication of authority, assumes the family role of both parents, managing home, servants (when they can be got) and children. The husband, decently producing wealth in his own way, and the wife, decently spending it in the right way—this is the bright picture of success in Crestwood Heights.

Decency is central to this composition. Puritanism may appear somewhat vaguely in the background, as a ghost ought to do, but squarely in front is the goddess, respectability. From a distance, supporting this central figure, from the wings so to speak, are the church and the synagogue. Their roles are ancillary. The goddess herself stands squarely upon the white pedestal of Victorianism. Respectability is a condition and mark of success.

Designed as a five-year study of the impact of an upper class culture upon the lives of children (mainly children in school), the field inevitably encompassed the schools themselves, teachers, homes, parents, churches, clubs and organizations of many kinds, playing fields, and even the University to which most of the youth aspire to go. In some thirteen chapters, two appendices, and almost sixty pages of notes, these repositories or emblems of culture are delineated.

Chapter I, **The Stage,** invites the reader to a consideration of some problems in social research. Sampling, for instance. Is the community under study typical of a country, of a city, or even of

an upper-class community anywhere? Obviously no one knows. Crestwood Heights may be an isolate, though many comparably placed and similarly favored communities have existed from the earliest times. Or closer home, did the study 'see' typical people, or record typical things about them?

If sampling is in question, perhaps the community is critical or crucial in some sense? The authors think so: it harbors Jew and Gentile; its influence as a standard or norm for other communities is assured because of the high proportion of leaders in society and industry which its favorable conditions guarantee; its freedom from privations warrants the assumption that whatever social pathology appears is not the consequence of destitution or material want.

The community gave willing cooperation in this study. The citizens, including children, subjected themselves gladly to interview, to group discussions, and produced volumes of information about their daily selves, daily activities, and no less about their fears, doubts and aspirations. Indeed, as might be expected, many of them, over this five-year period, came to look upon members of the team as father confessors, seeking advice and aid in their more troublesome problems.

Whether this community, indeed whether any community, will respond with joyfulness to the report is not in the record. The picture is not flattering, but intended in fact to be as thoroughly objective as reports made by people can be about other people of the same culture. In any event, along with a rich urbanity is found an intellectual superficiality; respectability without deep moral conviction; tact, courtesy and generosity with an eye to the impression created; and sociability in the service of good public relations. Perhaps this is too close to any middle and upper class morality to be comfortable. The reader must examine his own motives.

But the project was directed primarily to the study of children—"to see what could be added to the armament of a good school system that would make its contribution to the mental health of its pupils greater or better . . . . to provide pictures of the growing-up process . . . ." In the sequel this undertaking disclosed the second motive energizing this community. The first was success, the second maturity. By maturity is meant simply that childhood is important, not for itself, but as the stage preparatory to a successful maturity. Childhood means engaging in the right activities (those approved by child psychologists), learning useful social techniques, making the best friends, but above all in making the best possible grades in school, and so through matriculation to university or to a well-prepared entry into business. Parental approach to this problem, in

the best modern tradition of pedagogy, abjured blows, mental cruelty, compulsion and bribes. It depended rather on a steady manifest concern, steady encouragement, planned counselling, and strong school support.

Crestwood Heights, as the record of a five-year study, has been criticized because it embraces only a small community, and possibly an atypical one at that; because it lacks the objectivity thought the hall-mark of scientific reporting; because it fails to pin-point Jew and Gentile relationships; and finally because no clear-cut conclusions emerge.

The project was in actuality the sole issue of an ambitious—perhaps grandiose—scheme proposed by the National Committee for Mental Hygiene (Canada), to 'attack' a number of Canadian communities simultaneously. The only-child offspring thus lacks sibbling benefits of comparison, contrast, and stimulation.

Not only were all these limitations recognized by the authors, but as far as possible reckoned with and compensated for. The result is a narrative of daily life rich in detail, temperate in spirit, and profound in understanding.

H. E. Smith.

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THE COMMITTEE ON EDUCATIONAL RESEARCH
Faculty of Education
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Editorial

One of the more satisfying and potentially productive experiences of recent years has been the increasing degree of liaison and consultation that has developed between the University of Alberta and the Department of Education. This consultation has not infrequently been extended to include other organizations having a vital interest in education.

The progress report contained in this issue of the Alberta Journal of Educational Research covering a research project under way which is termed the Matriculation Study points this up in three ways.

In the first place the Advisory Committee on Educational Research which has been instrumental in establishing the Journal comprises in its membership the University, the Department, the Alberta School Trustees' Association, the Alberta Teachers' Association, and the Alberta Federation of Home and School Associations. In the second place the same bodies are represented on the continuing committee which regularly considers the effect of matriculation requirements upon the high school and of high school programs upon university entrance. The committee is called The Joint Committee to Co-ordinate University and High School Curricula. It makes recommendations to the University and to the Department in these respects. And in the third place the study being reported upon involves close co-operation between officers of the University and of the Department both in the planning of the research and in carrying forward its experimental and statistical work.

A reading of the progress report covering the Matriculation Study will surely convince one that matters of great concern, and of complexity, are under review and that a sincere and determined effort is being made to find out facts and then, based upon these facts, to arrive at procedures which will improve the validity of selection of university students. I wish to commend especially Dr. D. E. Smith, of the Department of Psychology, and Mr. A. B. Evenson, of the Department of Education, for their energetic pursuit of this study.

W. H. Swift,
Deputy Minister,
Department of Education.

A STUDY OF MATRICULATION IN ALBERTA

A. B. Evenson and D. E. Smith

I. *Introduction*

More and more of your young people are remaining for a longer and longer time in school. Already, in Alberta, the proportion of the 15-to-19-year age group remaining in school is close to one-half; and in certain other areas of this continent it is considerably greater than one-half. At the same time, the opportunities for satisfactory employment, for persons of this age group, except via the secondary school, are rapidly diminishing. Thus there has been relentless and increasing pressure on the secondary schools to make continuing adjustments in methodology and curriculum to meet the needs of an ever larger and more variable school population. These pressures have been greatly intensified by the rapid increase in birth rate immediately after the Second World War. The high school on this continent has been compelled to accept a dual responsibility: the preparation of a select group of students for further academic work at University, and the preparation of a much larger group of students for life in the world at large.

II. *Objectives of Secondary Education*

The normal educational expectation for young people fifty years ago was a Grade VIII Diploma, whereas today it is a High School Diploma. In the past, those who continued in high school were the select few who were definitely preparing for University courses which led to the professions. Today the high school has these objectives, as set forth in the *Curriculum Guide for Alberta Secondary Schools*:

1. Personal development;
2. Growth in family living;
3. Growth toward competence in citizenship;
4. Occupational preparation.

In addition, the high school has the task of preparing students for University.

The University receives a proportion of the high school graduates, and must from among these give a sufficient number of individuals training of sufficient quality to serve the needs of society for professionally trained persons. The University is expected to guarantee a high standard of training, despite the pressure resulting from a shortage of nurses, engineers, teachers, dentists, doctors and the like.

III. *Objectives of University Education*

The term "higher education" is often applied to university study; it implies not only a continuation of growth begun in the elementary and high schools, but also a kind of effort in which only the more capable students will be successful.

There is no authorized statement of the objectives of university education, but they might be stated as follows:

1. To display to men and women, more intensively than the secondary school can, the intellectual and cutural heritage developed in the arts and humanities, and in the natural and social sciences;
2. Thereby to prepare individuals of high ability for a fuller use of their talents in the life of the community, in business and in government;
3. To give professional training to individuals who require knowledge and skill of a high order in the practice of their vocations;
4. To develop scholars in the learned professions who will enrich the intellectual and cultural heritage for the future.

Traditionally the university takes little or no responsibility for the personal development of students. It recognizes, however, the importance of continuing this growth; and appreciates the part played by extracurricular activities in the life of the student. At this age, the student profits greatly by experience in organizing and supervising these activities, as well as participating in them.

IV. *Facts Relating to the Problem*

1. The drop-out rate is high. If we trace the Grade I enrolment of 1944 through the years, we find that although 18,495 started Grade I, nine years later 12,288 were in Grade IX, in the following year 9,637 were enrolled in Grade X, and in June of 1955, 3,600 received a High School Diploma, including 1,420 who secured matriculation (University entrance) standing. The high rate of mortality in the high school grades is not determined primarily by examinations, but is nevertheless related to intellectual capacity; only about 280 out of every 1,000 students enroled in Grade IX obtain a High School Diploma; and only about 54 of these have an I.Q. (Henmon-Nelson) of 105 or less.
2. High School enrolments are increasing. In 1912 only 2.08 percent of the total school enrolment was in high school (Grades X, XI, XII); in 1954 this proportion was 12.00 percent.. The interests and abilities of the larger number of high

school students are more varied than were the interests and abilities of the smaller enrolments of former years.

3. University education is not suited to all children. Terman has estimated that 12.7 percent of children are capable of "profiting from instruction in a first-class University". In 1955, only about 1,000 Alberta students entered degree programs in a University, whereas the proportion indicated by Terman would have meant about 2,500 students. At the current rate of drop-out, only about two-thirds of these may be expected to graduate with a degree. Clearly there are able students in our schools who do not have the opportunity to profit as they might from further instruction, whether in University or elsewhere; and at the same time some students are going on to University who are not well able to undertake University work.
4. The demand for high school and university graduates is increasing. There is a shortage in many of the learned professions. At the same time the demand for unskilled labor is decreasing.
5. Only about 55 percent of our high school population is taught in high schools which have three or more teachers from Grades X, XI, XII. Thus nearly half of our secondary school population is receiving instruction under academic conditions that are far from ideal.

These conflicting pressures on high schools and universities have led to difficulties in articulating the programs of these institutions. Alberta has had its share of these difficulties, and discussions by interested groups led ultimately to a request for a study. At the meeting of the High School Curriculum Committee held April 22 and 23, 1954, a motion was passed recommending "that the Articulation Committee set up an appropriate committee to study the validity of the present system of selecting students for university education, and to explore the merits of alternative systems."

The above motion was considered by the Joint Committee to Coordinate University and High School Curricula at its meeting on June 18, 1954, at which time it was agreed that a special committee should be set up to study the validity of the present system of selecting students for university education and to explore the merits of alternate systems. At the next meeting of this committee on December 8, 1954, a special subcommittee was set up with the following personnel:

Professor D. E. Smith
A. B. Evenson } Co-chairmen

Dr. S. C. T. Clarke
Dr. G. L. Mowat (replaced in 1956 by Dr. T. C. Byrne)
M. J. V. Downey
H. R. Hawes

It was agreed that this subcommittee should be known as The Matriculation Study Subcommittee with the following terms of reference:

1. Test the validity of Grade IX examinations and other tests as a measure of success in (a) Senior High School and (b) University;
2. Test the validity of Grade XII examinations as a measure of success in (a) Senior High School and (b) University;
3. Test the validity of success in non-academic subjects as a measure of success in University;
4. Study the experience of other universities in testing other types of matriculation regulations.

The Matriculation Study Subcommittee commenced its work early in 1955. Before arriving at some plan of action a survey of relevant literature and local research reports was made. The Subcommittee found many suggestions from research done elsewhere, but there were many gaps in information available about Alberta. Because of differences between various high school programs, as well as between universities, it was felt that the suggestions based on other studies must be confirmed by an exploratory study of success at the University of Alberta carried out with students from Alberta High Schools.

The Subcommittee posed a number of questions that seemed pertinent to the problem:

1. Is there sufficient flexibility in high school curricula to accommodate the wide differences in ability, interest and maturity that prevail among young people of similar age?
2. Why do the majority of students entering high school fail to receive a high school diploma?
3. Are high school standards changing?
4. How best can the schools identify those who will profit from further education?
5. Are Grade XII marks a sufficiently accurate predictor of success in university?
6. What criteria other than (or along with) Grade XII examinations might be used for the selection of university applicants?

7. Are there student who do not meet formal matriculation requiements yet might actually do commendable university work?
8. Are there students at university who should not be there?
9. Why do many students drop out of universities before graduation?
10. Are university standards changing?

On 19th April, 1955, the Matriculation Subcommittee made its first progress report to the Joint Committee. After a review of some of its findings to date, the Subcommittee sought, and obtained, approval in principle for a study of the 1951 Freshman Class at the University of Alberta.

The 1951 Freshman Survey

The Freshman class of 1951 had been selected because students registered in three-year degree programs, if successful, had already graduated, and those in four-year degree programs should graduate in 1955. It would thus be possible to investigate success of students at university, not only in the first year, but also at the end of normal university programs. Further, certain tests had been administered to that group which might prove useful, but which earlier freshmen had not been given.

The following data were tabulated on each student entering the University of Alberta in September 1951, and completing a full year in April, 1952:

(a) Name, age and sex;
(b) The general test score and the final grade for Grade IX;
(c) The name of any intelligence test taken during high school, and the I.Q. obtained;
(d) The distribution of grade points obtained in all courses in Grades X and XI;
(e) The actual grades obtained on certain representatives non-academic elective high school subjects (Bookkeeping, Shorthand, a technical subject, Art, Drama, Psychology, Sociology, Biology, Geology);
(f) The number of years spent in high school, and the year in which the high school program was completed;
(g) The average mark on Grade XII subjects;
(h) The score on the American Council of Education's Psychological Examination for Freshmen*;

*This test of intelligence or scholastic aptitude is administered to first year students at the University of Alberta (after registration) for the use of Student Advisory Services. The scores were obtained by the kind permission of Dr. A. J. Cook, Director of Student Advisory Services.

(i) The faculty or school in which the student was registered, and the average mark obtained, separately for each university session from 1951 to 1957;

(j) The degree or diploma obtained by every graduate, and the date it was obtained.

After these data were recorded, every item was coded and all the information transferred to I.B.M. punched cards. This material provides voluminously for the investigations required by the first three of the Subcommittee's terms of reference. To this end, the following analyses were given priority by the Subcommittee:

(1) Correlation of Grade IX examination results and the general test raw scores separately with first year university average marks and final year university average marks;

(2) Correlation of Grade XII average marks with first year university average marks, both for the total group and separately for some representative faculties;

(3) Correlation of A.C.E. total scores with first year university average marks, both for the total group and separately for some representative faculties;

(4) Similar correlations between Grade XII averages and average marks in second year at university, and in subsequent years, year by year, ending with the average mark in the year of first graduation;

(5) Similar correlations between A.C.E. total scores and average marks for second (and subsequent) years at university;

(6) Mean of Grade XII marks and of first year university marks, separately by various schools and faculties, of students who drop out at the end of the first year at university;

(7) The number of students, separately by faculties, who drop out of university year by year;

(8) Correlation of grade points in Grades X and XI, in both academic and non-academic electives, with average marks at university;

(9) Analysis by multiple correlation of combinations of two or more of the variables indicated above with average mark at university.

In its first progress report to the Joint Committee, the Matriculation Subcommittee indicated that it would be desirable to administer a special battery of scholastic aptitude and subject achievement tests. In its review of the experiences of other universities, it was impressed by:

1. The research study completed in Ontario by W. D. Fleming on "Factors Affecting the Predictive Accuracy of Ontario Grade XIII Results".
2. The projected study which is to be carried on in the province of Ontario during the next three years. This latter study is fully described in a pamphlet entitled "Prospectus for a Study of the Supply of Canadian University Talent", (Revision of Bulletin 17).

In its second progress report, therefore, the Subcommittee raised these questions:

1. Is the best potential university material being selected on present criteria?
2. What proportion of students who do not go to university have comparable aptitude and achievement with those who do?
3. Are high school standards in Alberta changing?
4. Would not careful follow-up studies on the students tested provide much meaningful and useful information?
5. Would one or two additional criteria (that is in addition to Grade XII results) improve our present selective methods?

The Subcommittee went on to obtain approval in principle for a study of Grade XII students in the spring of 1956, using a battery of standard ability and achievement tests developed by Educational Testing Service and the College Entrance Examination Board.

The 1956 Grade XII Survey

The College Entrance Examination Board (CEEB) has operated in the United States for approximately a half-century to give a common basis for admission to universities of students trained in the varying educational systems of 48 states. The Board now acts in an advisory and supervisory capacity, and the work of preparing, printing, issuing, administering and scoring the tests is carried out by Educational Testing Service (ETS)*.

CEEB examinations contain sixteen tests of ability and achievement, of which the following were selected for this survey:

(1) The Scholastic Aptitude Test, which yields both a verbal score (SAT-V) and a mathematical score (SAT-M);

(2) Seven achievement tests (selected for their relation to Grade XII subjects commonly presented for matriculation by Alberta students):

*The Subcommittee owes a deep debt of gratitude to the College Entrance Examination Board and Educational Testing Service for supply of materials, marking of papers, and preliminary analysis of results, all at very low cost; and particularly to Dr. D. Black, of the staff of ETS, Los Angeles, for advice and assistance far beyond the call of duty.

College Board Achievement Tests	*Alberta Grade XII Courses*
English Composition	English 30
Biology	Biology 32
Chemistry	Chemistry 30
Physics	Physics 30
Intermediate Mathematics	Mathematics 30
Advanced Mathematics	Mathematics 31
French	French 30

A province-wide sample of high-school seniors was used. Every attempt was made to avoid bias from geographical location, student ability, and interest reflected in his own selection of subjects in the achievement tests. The students were therefore randomly selected to take certain pairs of achievement tests, in addition to the Scholasic Aptitude Test, which every student was to take.

Information regarding the fall registration in Grade XII subjects was already recorded on I.B.M. punched cards. These cards were then sampled to obtain groups of students who were prepared to write CEEB achievement tests by participation in corresponding Grade XII subjects.

In an attempt to avoid bias through subject combinations selected by students or their teachers, students were arbitrarily assigned to 21 groups, each group representing one of all possible combinations of two achievement tests from a possible battery of seven tests. The sampling aimed at a final total sample of 1,200 cases per subject elective, or 200 cases for each of the subject pairs. It was estimated that 200-250 cases of the initial sample per subject would be lost for a variety of reasons. Therefore, a random sampling of 1,435 cases per subject was drawn, with one exception: there were only 1,183 students in the Province taking Mathematics 31 which made them eligible to write the College Board's Advanced Mathematics test. A sample of 1,110 cases for this particular subject was drawn, which, in effect, was not a random sample, but rather represents the full population for this subject.

The CEEB tests were written on May 18, 1956.

The final number of students actually writing each test and test pair is listed in the following table:

Size of Achievement Test Sample Including Sample Size for Twenty-one Subject Pairs

	Eng.	Bio.	Chem.	Phy.	I. Math.	Ad. Math.	Fr.
English	1,273	.....	.....	.....	.....	.....	.....
Biology	223	1,254	.....	.....	.....	.....	.....
Chemistry	199	209	1,267	.....	.....	.....	.....
Physics	206	195	227	1,223	.....	.....	.....
I. Math.	228	224	219	206	1,236	.....	.....
Ad. Math.	149	128	146	150	158	880	.....
French	206	215	218	212	180	143	1,203

A few students wrote the Achievement Tests without taking the SAT. An additional group of students was randomly selected from the total population to take only the SAT, bringing the total sample of SAT scores to 5,818.

It was decided that the whole study would be strengthened if all or practically all of the Alberta Grade XII students would write the Educational Testing Service's School and College Ability Test (SCAT), level 1. To facilitate the scheduling of the total testing program it was decided that this particular test would be administered during the period of the Easter examinations. The total number of students who wrote SCAT, level 1, was 6,450.

At the time the CEEB tests were administered, every student was required to complete a Student Questionnaire, containing 25 questions relating to his personal background, and plans for further study and future employment.* At the same time, principals of high schools were asked to rate all students participating on 9 factors involving initiative, industry, extra-curricular activities, and interest in further education, with a 10th rating of overall prospects for success in university.

Results of all tests, replies to all questions and ratings of all factors have been recorded on I.B.M. punched cards and are available for analysis. Grade point scores for Grade X and XI subjects, and marks on Grade XII Departmental Examinations, have also been recorded on the cards, and marks obtained at the University of Alberta (by those students registered there) will be added as they bceome available.

The Subcommittee hopes to learn from this material:

(a) How valid is our present method of selection which uses a single criterion, namely results on Grade XII examination?
(b) Would the additional factor of scholastic aptitude improve our present selective method?
(c) Would standardized achievement tests, such as those of the College Board, predict university success any better than do our Grade XII examinations?
(d) What proportion of high school students who do not enter university have scholastic aptitude and achievement comparable to those who do?
(e) How do students of small and large high schools compare in scholastic ability and achievement?

The Educational Testing Service provided means, standard deviations, and percentitle equivalents (based on the Alberta group)

*This questionnaire was adapted from one used in the Province of Ontario's "Study of the Supply of Canadian University Talent".

for scores on all tests used. Data were also supplied showing the scores made by students in the United States on the same tests. Since the test is taken in the United States only by high school students who are applying for a university entrance, these scores are not comparable to the whole group of Alberta Grade XII students, who have many programs and plans for the future. The Subcommittee therefore obtained the names of all students who applied for admission to the University of Alberta in 1956, who would form a group comparable with the United States norm group. Names of students enrolled in the University of Alberta for the 1956-57 session were also obtained.

The Subcommittee has the following studies under way:

(a) Numerous correlations such as the following are being calculated:
   1. Grade XII examinations against CEEB Achievement Test scores.
   2. Aptitude scores against achievement, both in Grade XII and on the College Board Achievement Tests.

(b) Comparison of the attainment of Alberta students on the CEEB tests with national norms, particularly from the United States.

(c) Numerous comparisons between students who entered the university last fall with those who were not accepted and with these who did not apply.

These studies are planned for the future:

(a) Some time during the summer and fall of 1957 a good part of the available data will be studied in relation to university results at the end of the first year.

(b) In 1958 this study will be carried one step farther after the results of the second year university are known.

Application of Results

Analysis of the data obtained in the surveys described above, and inferences from these data, might eventually affect school curriculum, placement and examinations; university entrance requirements; and university curriculum, placement and examinations.

The results obtained will be reported in subsequent articles in this journal.

THE DEVELOPMENT OF DESIGN IN ALBERTA'S EDUCATION

THE PRE-PROVINCIAL PERIOD 1875-1905

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The separate school is a type of local administrative organization unique to Canadian education. This article attempts to appraise the influence of the separate school question on design and structure in the Alberta provincial system of schools. Since the Alberta design is a product of the Territorial period the study is historical with particular reference to the development of provincial autonomy and the formation of cabinet government.

The Policital Growth of the North West Territories—1875-1905

During the westward expansion of Canada the term North West Territories has been applied to different geographical areas in successive historical periods. The area with which this study is concerned is that presently occupied by the provinces of Alberta and Saskatchewan. The entire territory west of the province of Manitoba to the foothills of the Rocky Mountains was for a thirty year period a single political unit with a government centered eventually in the city of Regina.

The distinctive political career of the North West Territories commenced with the passage by the Dominion Parliament of the North West Territories Act of 1875.[1] The Act created a type of colonial government having a lieutenant-governor selected by the federal government and an appointed council to assist him in the administration of the western territories.[2] The council was granted the power to "make, ordain, and establish" ordinances within the class of subjects enumerated, these dealing with such problems as local taxation, property and civil rights, police and "generally all matters of merely local or private nature."[3]

Within the body of the Act were provisions assuring the future self-government of the Territories. Any area of one thousand people might be granted the privilege of electing a representative to the council. When the number of elected members reached twenty-one the Council was to be reconstituted as a legislative assembly.[4]

1C. Cecil Linguard, **Territorial Government in Canada** (Toronto: University of Toronto Press, 1956), p. 4.
2**Statutes of Canada**, 38 Victoria, c. 48, sec. 3.
3**Ibid.**, sec. 7.
4**Ibid.**, sec. 13.

The rapid growth of population in the Territories was reflected by the increasing number of elected members in the Council. Within ten years those elected outnumbered the appointed, and by 1888 the Territories Act was revised to established a representative assembly.[5] Provision was made, as well, for the selection by the Lieutenant-Governor of an advisory council from the members of the Assembly to proffer advice on matters of finance.[6] Through this section of the revised statute were drafted governing structures admitting the possibility of responsible as well as representative government.

A limited measure of parliamentary government only was established through the appointment of an advisory council. The age long struggle, so familiar to British history, for the control of the purse and the full control of the executive by the legislature was again reenacted in Canada's youngest legislature during the next three years.[7] In the end the Canadian parliament granted the territorial assembly full control over the expenditures of territorial funds, most of which came by way of grant from the senior government.[8] The relationships of the Advisory Council to the Assembly were clarified by an ordinance in 1892 in which the Council was renamed the Executive Committee of the Territories.[9] Finally responsible government "defacto" established by this territorial ordinance became "de jure" through the federal statute of 1897 which recognized that "the expression Lieutenant-Governor in Council means the Lieutent-Governor of the Territories by and with the advice and consent of the Executive Council of the Territories . . . ,"[10] the members of which were to be selected from the Legislative Assembly.

Cabinet government was facilitated further through this act by permitting members of the Assembly to receive an annual salary from public funds.[11] The North West Assembly immediately passed a Public Service Ordinance providing for the establishment of departments of the Attorney-General, Treasury, Public Works, Agriculture, and Public Instruction, the head of each being defined as a "member of the Executive Council for the time being presiding over a department."[12] Following these constitutional changes a cabinet

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5**Statutes of Canada**, 51 Victoria, c. 19. "An Act Respecting the North West Territories 1888."

6**Ibid.**, sec. 13.

7Lingard, **op. cit.**, p. 6.

8**Statutes of Canada**, 54-55 Victoria, c. 22. "An Act to Amend the Acts Respecting the North West Territories, 1891."

9**Ordinances, North West Territories.** No. 1 of 1891-92.

10**Statutes of Canada**, 60-61 Victoria, c. 28. "An Act to Further Amend the Acts Respecting the North West Territories, 1897."

11**Ibid.**, sec. 9.

12**Ordinances, North West Territories**, No. 13 of 1897. "An Ordinance Respecting the Public Service of the Territories."

known as the Executive Council was formed under the leadership of Sir Frederick Haultain, the first premier of the North West Territories.

The contributions of the North West Assembly to its legal successors, the government of Saskatchewan and Alberta, are major and historically significant. At the turn of the century the foundation of a school system had been laid, a scheme of municipal organization devised, and a system of judicature established.[13] The basic social institution of the twin provinces are an inheritance of the territorial period and a product of its political thinking and leadership.

Despite the large measure of self-government achieved by the Assembly, the territorial government suffered certain limitations through the lack of provincial status. The government could not, for instance, charter railways, nor borrow money on public credit. In addition, the natural resources of the Territories had been kept in the hands of the federal government making the Assembly dependent on Ottawa for its major revenues.[14] The following quotation from Lingard summarizes the political stature of the Territories, underscoring a need for the increased autonomy which was possible only through full membership within the Canadian conferation.

> The closing years of the century found the Territories with a constitution approaching the provincial basis, with enlarged jurisdiction, increased responsibilities and new duties, but with inadequate revenues to deal with these. The Dominion government had been more generous in extending legislative jurisdiction than in enlarging appropriations.[15]

The debate over provincial status for the Territories occupied the attention of Canada for the first five years of this century. A major facet of the national argument, significant to this study, was that of deciding the type of school system to be established or maintained in the proposed province or provinces. The backgrounds of the separate school issue and the compromise with which it was eventually resolved are outlined here for their relevancy to an analysis of design in the Alberta school system.

The Separate School Question and Provincial Autonomy

The origins of separatism in public education, while unquestionably an outgrowth of religious and racial friction in Upper and Lower Canada, data back in the legal sense for Alberta to the North West Territories Act of 1875. The federal parliament, for reasons deriving from the political and social context of central Canada,[16] granted

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[13]Shortt and Doughty, **Canada and Its Provinces**, Vol. 19, p. 222.

[14]C. C. Lingard, **op. cit.**, p. 7-8.

[15]**Ibid.**, p. 20.

[16]George M. Weir, **The Separate School Question in Canada** (Toronto: Ryerson Press, 1934), p. 27.

control of education to the North West Council but limited its autonomy with the following proviso:

> A majority of ratepayers of any district or portion of the North West Territories . . . may establish such schools therein as they may think fit, and make the necessary assessment and collection of taxes therefor; and further, that the minority of ratepayers therein, whether Protestant or Roman Catholic, may establish Separate Schools therein and that, in such latter case the ratepayers establishing such Protestant or Roman Catholic Separate Schools shall be liable only to assessments of such rates as they may impose upon themselves in respect thereof.[17]

A dissentient system of schools for the North West Territories similar to that existing in Quebec was implied by this statute. Recognition of this in the "School Ordinance" of 1884 involved two important principles of denominational schools: the exemption of the taxpayer of a minority group from the support of schools which the majority "may think fit" to establish if he were a separate school supporter; and the establishment of a central board of education with a membership drawn equally from the Catholic and Protestant citizenry. This board was to "resolve itself into two sections" Protestant and Catholic, each to have the management and control of schools under its jurisdiction as well as the grading and licensing of teachers, the choice of textbooks, and the appointment of inspectors for these schools.[18] The effect of the ordinance was to set up two distinct school systems in the territorial area.

After the establishment of representative government in 1888, the administration of territorial schools became a subject of bitter controversy in the North West Assembly. The issue lay between the supporters of a national or common system of schools and those advocating the retention of separatism along sectarian lines in public education.[19] The debate centred on a proposed reconstitution of the Board of Education, the object of which was to create radical changes in the central administrative agency.

The ordinance of 1892 modified the existing separatism considerably, moving in the direction of a national or state system of schools. The Board of Education was abolished to be replaced by a Council of Public Instruction consisting of the Executive Committee of the North West Assembly and four appointed persons, two of whom were to be Catholic and two Protestant. The function of the appointed members was, however, to be purely advisory, they having no vote in the Council's proceedings.[20] Minority schools were maintained, and the principle of free choice in tax payments was granted the minority ratepaper who might wish to support a separate

17 **Statutes of Canada, 38 Victoria, c. 49, Sec. XI.**
18 **Ordinances, North West Territories, No. 5 of 1884, sec. 5.**
19 Shortt and Doughty, **op. cit.**, Vol. XX, p. 453.
20 **Ordinances, North West Territories, No. 2 of 1892, sec. 5.**

school of his own denomination, either Catholic or Protestant. Separate Schools were to be governed by the same regulations as those applying to public schools. Uniformity was established with respect to courses of study, textbooks, teachers' qualifications, departmental examinations, and inspections.[21] Inspectors of schools were to be appointed by the Lientenant-Governor-in-Council and were enjoined to administer the regulations of the Council in all publicly supported schools in the Territories.[22] The discretionary powers of the local school agencies or boards were related to religious observances and instruction. They could rule that school be opened with the Lord's Prayer, and they could provide some form of religious education during the last half hour of the school day.[23]

The final step in the modification of Section XI of the North West Territories Act was taken through the Ordinance of 1901.[24] This enactment placed education directly under cabinet control with a member of the Executive Council acting as head of the newly created Department of Education envisioned in the Public Service Ordinance of 1897. With this final change in administrative structures, the North West Assembly had evolved a national or state system of public education with provision for separatism locally but with a centralized provincial control of the interna of all schools.

The separate school question once more became a matter of dispute during the nation-wide controversy over the establishment of the provinces of Alberta and Saskatchewan in 1905. Sir. Wilfrid Laurier, Prime Minister of Canada, proposed the inclusion in the autonomy acts for the two provinces of a proviso that the provincial control of separate schools would be "subject to the provisions of the said section 93 (British North America Act) and in continuance of the principle heretofore sanctioned under the North West Territories Act."[25] This proposal precipitated a bitter national debate that centred around the issue of provincial sovereignty in the field of education.

The Laurier proposal, while intended ostensibly to assure the system of separate schools fully established by the ordinance of 1901, could well provide the legal basis for challenging all territorial legislation modifying the denominational system established by the original North West Territories Act.[26] The Liberal government maintained that Section 93 of the British North America Act should apply to any province entering confederation with a system of

21Ibid., sec. 5c.
22Ibid., sec's. 11 and 21.
23Ibid., sec. 50.
24Ordinances, North West Territories, No. 29 of 1901.
25Weir, op. cit., p. 67.
26Ibid., p. 67-68.

separate schools[27] and, further, that the British North America Act 1871 gave the Dominion Parliament the legal right to prescribe constitutions for the provinces.[28] The proponents of provincial rights countered that section 93 should apply exclusively to Ontario and Quebec, it being a compact freely assumed by those provinces in 1867, and that other provinces should have the right to decide their own systems of education. For the Dominion Government to protect by constitutional restriction the existence of a separate system of schools that it had itself created through federal legislation was, by opposition standards, an unwarranted infringement of provincial sovereignty.[29] The issue was not the propriety of separatism as such, but the refusal of the Dominion cabinet to accept fully the conceptual design of federal decentralization and provincial autonomy in the national system of education.

Political pressure on the Liberal government forced it to retreat from its original position and to resolve the dispute by a generally acceptable compromise. Section 17 of the Alberta Act quoted below became the constitutional basis for the exercise of authority over schools by the provincial legislature:

> Section 93 of the British North America Act 1867 shall apply to the said Province with the substitution for paragraph (1) of the said section 93, of the following paragraph:
>
> (1) Nothing in any law shall prejudicially affect any right or privilege with respect to separate schools which any class of persons have at the date of the passing of this Act, under the terms of Chapter 29 and 30 of the Ordinances of the North West Territories, passed in the year 1901, or with respect to religious instruction in any public or separate school as provided for in the said Ordinances.[30]

The long range effect of this statute has been to freeze local separatism dependent on a minority right to establish church-related schools, in the mold created by the Ordinance of 1901. The validity of Section 17 has gone unchallenged in the courts though conceivable the legislation might have been declared *ultra-vires* of the Dominion Parliament.[31] The constitutional issue as to whether the provisions of Section 93 apply exclusively to Ontario and Quebec, the only provinces having their constitutions incorporated in the British North America Act, or should be applicable to all provinces entering confederation after 1867, has had no judicial decision. Methods of local school organization, nevertheless, that were originally an expedient answer to problems created by racial and religious strife in Upper and Lower Canada have been imposed on

27 Lingard, **op. cit.**, p. 165.

28 **Statutes of Canada**, 34 and 35 Victoria, c. 28, sec. 2. "British North America Act 1871."

29 Lingard, **op. cit.**, pp. 165-197.

30 **Statutes of Canada**, 4 and 5 Edward III, C. III, sec. 17. "The Alberta Act, 1905."

31 Wier, **op. cit.**, p. 70.

two of the western provinces through federal action rather than through provincial planning or agreement. Local separatism has been an eastern export that only part of western Canada successfully avoided.

Despite section 17 of the Alberta Act, the conceptual design of education in Alberta is not dissimilar to that of other provinces. The statute restricts but does not negate the principle of provincially autonomy in education. While it is true that the limitation was imposed by a senior government rather than agreed to by the people of the province, nonetheless it had its source in common with a major share of Canadian constitutional law. Furthermore, the provincial legislature is free to alter the character of public education as long as it recognizes that once established "a separate school district and board thereof shall possess all rights, powers, privileges and be subject to the same liabilities and methods of government as is herein provided in respect of public school districts."[32] The ordinance protects separate school districts from discriminatory treatment but, similarly to public school boards, separate school boards are the agents locally of the province, subject to provincial regulation and having no constitutional privileges other than those related specifically to religious instruction.

The Separate School Question and Cabinet Control

The movement to modify the denominational school organization established in 1884 explains in part the assumption of control by the Executive Council of the North West Assembly. With the growth of parliamentary procedures after 1888, territorial administrative structures were altered, transferring executive authority from the Lieutenant-Governor to a responsible cabinet. Concomitant with this development came the centralization of authority over schools in an executive body possessing administrative functions of a general nature. The elimination of the special purpose board of education, while seemingly inevitable under parliamentary government, was accelerated by the issue of separatism. That Ontario, too, had followed this route, although perhaps for different reasons, gave added impetus to the transfer of power.[33]

No responsible cabinet existed during the period 1884 to 1891 when territorial schools were administered by a special board as a unique function of government. The Executive Committee created by the Ordinance of 1893 was the first administrative body enjoying the full confidence of the Assembly through its acceptance of the

[32]**Ordinances, North West Territories, c. 29, sec. 45, 1901.**

[33]T. C. Byrne, "Design and Structure in Canadian Education," **The Alberta Journal of Educational Research,** Vol. III, No. 1, (March, 1957) pp. 28-43.

principle of cabinet responsibility. Administration by the Council of Public Instruction, the successor to the Board of Education, was an intermediate step in the achievement of cabinet control. The new administrative board was, in effect, the cabinet, but the establishment of education as a government department was not yet possible. While vestiges of denominationalism remained in the stipulated religious qualifications for the four appointed members, a major step had been taken towards a state or common school system by coordinating the instructional leadership of all schools under an appointed official, the Superintendent of Education.

The Public Service Ordinance of 1897 made possible eventually the complete integration of school control into the general administrative structures of the Territories with a cabinet minister as head of the newly created department. All that remained of the original Board of Education was an advistory council with denominational representation having no real function beyond that of proferring advice. Within seventeen years authority over territorial schools had been transferred from a board constituted along denominational lines to the Executive Council of an Assembly representative of the province as a whole. Church-related schools were a local possibility, but centrally the cabinet exercised, through its department, full control of the school system in a program of state education which accepted little or no responsibility for religious instruction.

The maintenance of a national or common school system through the exercise of centralized control over textbook selection, curriculum, teacher certification and inspection strengthened the centralizing trends in the administration of instruction. The North West Assembly had extended, through the cabinet, its control over the interna for the purpose of securing a common system of schools. At the beginning of the period of assembly government separatism existed at both central and local levels. By 1901 it had been relegated to specific types of local districts. To widen the scope of local authority by decentralizing control over interna might have the effect of increasing separatism at the expense of a common program of instruction, a complicating factor in estimating the future role of provincial leadership.

Conclusions

1. The pattern of local school organization developed to meet religious problems in Upper and Lower Canada was transplanted to the North West Territories by legislation of the Dominion parliament.
2. The replacement of the denominational system of education established in the North West Territories by a national system

of schools was effected by centralizing school administration in the executive council or cabinet exercising control over textbook selection, programs of study and school inspection. The central authority assumed a dominant role in the control of interna in order to limit separatism to local administrative rather than instructional differences.

3. Parliamentary government has resulted eventually in the elimination of special purpose provincial boards in Canadian school administration, centralizing school control in a government department under cabinet leadership. This has enhanced both the power and the prestige of the central agency.

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READING AND ARITHMETIC REASONING A PARTIAL CORRELATION AND MULTIPLE REGRESSION ANALYSIS*

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Introduction

The relationship of the basic skills of reading and arithmetic to the content areas is becoming a fairly well-tilled plot in the field of educational research. However while the value of such research is unquestionable, there is a disappointingly small number of studies on the relationships which may exist *between* these skills. In a study of aschievement at the Grade XI level, Aukerman[1] suggested that general reading ability might be the most differentiating factor between good and poor students in mathematics. Sutherland[2] in a study of arithmetic problem-solving, concluded that three factors appear in equal saturation, viz. 'g', 'verbal', and 'numbers'. In a study of arithmetic achivement at the Grade VII level, Treacy[3] suggested that there was a marked relationship between proficiency in reading skills and arithmetic achievement. Johnston[4] found that the vocabulary test of the Chicago Primary Mental Abilities yielded the highest correlations of various abilities with the regular arithmetic problem-solving tests. Traxler and Townsend,[5] in a study of the relationship of differences between verbal and numerical aptitude, suggest that differences between verbal and numerical scores have value for the prediction of differences between reading achievement and mathematical achievement of individual pupils. Hamilton[6] found evidence to suggest that increased general reading will improve reading comprehension of mathematical material. Hansen[7] found that superior achievers in arithmetic problem solving

*The writer wishes to express to Professor Eric Hodgson his indebtedness for valuable advice.

1Robert E. John Aukerman, "Differences in The Reading Status of Good and Poor Eleventh Grade Students," **Journal of Educational Research** XLVI, 1948, pp. 498-515.

2J. Sutherland, "An investigation into Some Aspects of Problem-Solving in Arithmetic," **British Journal of Educational Psychology** II, 1941, pp. 215-222.

3J. P. Treacy, "The Relationship of Reading Skills to the Ability to Solve Arithmetic Problems," **Journal of Educational Research 38**, 1944, pp. 86-96

4J. T. Johnston, "On the Nature of Problem-Solving in Arithmetic," **Journal of Educational Research 43**, 1949, pp. 110-115.

5Arthur E. Traxler and Agatha Townsend, "Relationship of Difference between Verbal and Numerical Aptitude to Differences in Achievement in English and Mathematics," **Educational Records Bulletin 61**, (July 1953), pp. 61-65.

6R. C. S. Hamilton, "Construction and Administration of an Instrument for Measuring Reading Comprehension of Mathematical Material," **British Journal of Educational Psychology XXIII** (November 1953), pp. 203-205.

7Carl W. Hansen, **Journal of Educational Research** Vol. 38, No. 2, 1944, pp. 111-118.

scored significantly higher in tests of general reading ability than inferior arithmetic achievers. Lazerte[8] in his comprehensive survey of the studies of arithmetic problem-solving abilities has this to say of reading ability and problem-solving:

> Pupils are handicapped in problem-solving if they are deficient in reading ability . . . The real problem meant to be conveyed often remains hidden until the printed sentences are properly interpreted. Even when the problem is clearly in mind, the relationship of part to part must be appreciated before a correct solution can be planned.

On the basis of this evidence, it appears reasonable to assume that some relationship does exist between reading and arithmetic achievement. However, the majority of these studies have been carried out at the elementary level of Grade VI and up. There is a great need for more intensive research in the primary grades.

The Problem

The present study represents an attempt to examine the possible relationships which may exist between reading achievement and arithmetic achievement at the Grade II level. In particular, the study will be concerned with an analysis of two areas which might not only be representative of their respective skills but which might, on an a priori basis at least, prove a fruitful source of exploration for the purposes of this study, namely reading comprehension (together with word knowledge) and arithmetic reasoning. Stated formally, the problem is this: to what extent does variance in reading comprehension and word knowledge contribute to variance in arithmetic reasoning?

Tests

The Stanford Achievement Test is, according to its authors, "a series of comprehensive achievement tests designed to measure the important knowledges, skills and understandings commonly accepted as desirable outcomes of the major branches of the elementary curriculum."[9] The Primary Battery includes five tests, Paragraph Meaning, Word Meaning, Spelling, Arithmetic Reasoning, and Arithmetic Computation. Of these, all but Spelling appear to lend themselves to the needs of this investigation, and a word or two on each might be in order.

The Paragraph Meaning Test consists of a number of paragraphs in progressive order of difficult, from each of which one or more words has been omitted. Comprehension of the paragraph is measured by the pupil's success in selecting the proper word for each omission from four possible choices. A split-half reliability coefficient of .956 is claimed for this test at the Grade II level.

[8]M. E. Lazerte, **The Development of Problem-Solving Ability in Arithmetic**, p. 123.
[9]Stanford Achievement Test, Primary Battery, Manual. World Book Company, 1953.

The Word Meaning Test claims to measure not only word meaning of the definition type but "higher-level comprehension of the concepts represented by words, and fullness and understanding of terms."[10] A reliability coefficient of .912 is claimed.

The Arithmetic Reasoning Test, according to its authors, "involves a combination of the language of quantitative comparison, arithmetic information, ability to read, the thinking aspects of problem-solving, some ability in computation, and other factors merged into one score."[11] This test yields a reliability coefficient of .788.

Finally, the Arithmetic Computation Test attempts to measure primarily addition and subtraction. The split-half reliability of this test is given as .878.

The first two tests, Paragraph Meaning and Word Meaning can be combined to yield an Average Reading Score.

Procedure

The Stanford Achievement Test (Primary Battery, Form J) was administered to 159 grade II pupils from fourteen graded rural schools in Alberta in the last month of that grade. In addition the Otis Alpha Quick-Scoring Mental Abilities Test was administered since, for obvious reasons, analysis of achievement must take intelligence into account. No significant differences with respect to means and variances of the fourteen groups were found, and homogeneity of the total pooled sample was assumed. Statistical analysis of the data involved obtaining product-moment r's, partial r's, and a multiple r expressed in terms of Beta coefficients obtained by the Doolittle solution.

Results

Table I shows the means, standard deviations and score ranges for the five variables. The achievement scores are grade scores.

TABLE I

MEANS, S.D.'S AND SCORE RANGES

	Arithmetic Reasoning	Arithmetic Computation	Average Reading	Otis I.Q.	Chron. Age in Months
Means	31.43	28.64	32.23	102.02	98.15
S.D.'s	6.20	3.43	7.07	12.86	6.67
Range	13-49	15.38	18-50	70-137	84-130

It is of interest to note that both the Arithmetic Reasoning and Average Reading grade scores suggest a wider range of individual differences with respect to achievement in these areas than do the scores in Arithmetic computation. While it is difficult to do little

[10] Ibid.
[11] Ibid.

more than speculate on the interpretation of these findings, three possible questions may be asked. First, is the discriminatory power of the Arithmetic Computation Test weaker than that of the Arithmetic Reasoning and Average Reading Tests for this sample? Secondly, could the relatively smaller variance of the Arithmetic Computation scores be attributed to pedagogical factors? Finally, does the emergence of arithmetic reasoning ability precede that of arithmetic computational ability as measured by this test, and for this sample?

Table II indicates the development of a fourth order partial correlation of Arithmetic Reasoning and Average Reading, with I.Q., Arithmetic Computation and chronological age partialled out.

TABLE II

Variable X_1 = Arithmetic Reasoning
Variable X_2 = Average Reading
Variable X_3 = Arithmetic Computation
Variable X_4 = Otis I.Q.
Variable X_5 = Chronological Age

Zero-order Correlations (product-moment) N = 159

$r12 = .64$			
$r13 = .51$	$r23 = .56$	$r34 = .31$	$r45 = -.50$
$r14 = .49$	$r24 = .69$	$r35 = .01$	
$r15 = -.28$	$r25 = -.29$		

Partial r's

$r12.3 = .49$	$r12.34 = .33$	$r12.345 = .33$
$\sigma 12.3 = 4.63$	$\sigma 12.34 = 4.58$	$\sigma 12.345 = 4.55$

β coefficients

$\beta 2 = .417$	$\beta 4 = .056$
$\beta 3 = .260$	$\beta 5 = -.133$

Multiple Regression Equation (score form)

$$X_1 = .366X_2 + .470X_3 + .027X_4 - 124X_5 + 15.59$$

Multiple R in terms of β Coefficients

$R^2 1.2345 = .267 + .133 + .027 + .037 = .464$
R 1.2345 = .681 σ 1.2345 = 4.55
R 1.2345 = .671 (corrected for shinkage)

Discussion

The results indicate that a significant relationship exists between reading comprehension (together with word meaning) and arithmetic reasoning as measured by the Stanford Achievement Test.

At first glance, one might suppose that this relationship might be accounted for by such obvious variables as intelligence, chronological age, and not quite so obviously, arithmetic computation. Yet even when these variables are partialled out, the original product-moment r drops only from .64 to .33, which is still significantly different from zero. Furthermore, the multiple regression equation for arithmetic reasoning indicates that variance in average reading scores makes a substantially greater contribution to variance (27%) in arithmetic reasoning than does any of the other variables. However, it must be noted that even when we summate the individual contributions of variance in computation, reading, intelligence and age we can only account for approximately 46% of the variance of arithmetic reasoning, leaving 54% which must be accounted for by other factors. This suggests that any attempt to predict achievement in arithmetic reasoning from the other variables would be a somewhat perilous undertaking at the grade II level.

One of the implications of these findings is that if a causal relationship does exist between reading achievement and arithmetic reasoning, this factor must be taken into account in our teaching at the primary grade levels. It appears to be a matter of simple deduction that if, even at the grade II level, poor reading comprehension (among other things) will be reflected in low arithmetic achievement, the long term effects will be still more serious. Indeed, much of the literature on this subject is concerned with the effects of poor reading comprehension on arithmetic problem-solving at the high school and college level.

Summary and Conclusions

A partial and multiple correlational analysis of the Average Reading, Arithmetic Reasoning and Arithmetic Computation Grade Scores of 159 Grade II rural pupils in the Stanford Achievement Test (Primary Battery) suggested that:

1. There is a significant relationship between Average Reading scores and Arithmetic Reasoning scores even when age and intelligence are partialled out.

2. Variance in Average Reading scores contributes substantially to variance in Arithmetic Reasoning.

3. In the reading comprehension aspects of primary education, attention should be given to teaching for transfer to the problem-solving aspects of arithmetic skills.

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EDUCATIONAL RESEARCH IN AUSTRALIA*

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Australia is a young, vast, sparsely-populated country. The first European settlement in Australia did not take place until after the American Revolution, while the Commonwealth of Australia was not formed until 1901. Australia is about the size of the United States, but has a population of approximately only nine million. Yet in spite of youth and meagre population, Australia's organization and accomplishment in educational research should be of interest to Canadians.

There are four main types of agencies at present carrying on educational research in Australia: the Australian Council for Educational Research, the State departments of education, the Commonwealth Office of Education, and the universities.. This article will be concerned mainly with the organization and activities of the first of these agencies; a future article may concern itself more fully with the others.

The Australian Council for Educational Research

The A.C.E.R. as it is usually called, is an autonomous body. It makes its own policy and decides its own program, entirely independently of control by any governmental agency, university, or other body. A.C.E.R. was founded in 1930 as the result of an endowment from the Carnegie Corporation of New York. Following a visit to Australia in 1928 of Dean Emeritus James E. Russell of Teachers College, Columbia University, a committee consisting of Mr. Frank Tate, Professor H. Tasman Lovell, and Professor A. Mackie, after consultation with delegates from each of the State Institutes for Educational Research which had been set up, formulated a proposal which was acceptable to the Carnegie Corporation. Dr. K. S. Cunningham was appointed as Executive Officer. Since the termination of the Carnegie endowment in 1943, the Council has been financially supported from Australian sources.

The Council consists of one representative of each of the State Institutes for Educational Research, and three other members co-opted by the Council. A State Institute for Educational Research is defined as a body of individuals in each State interested in educa-

*The writer is indebted to D. W. C. Radford, Director, Australian Council for Educational Research, for providing some of the materials upon which this article is based, and particularly for permission to use parts of the manuscript of an article, by J. J. Pratt and W. C. Radford, to appear in the first issue of the new **Australia Journal of Education.***

tional enquiry, and recognized by the Council for purposes of nominating a member to the Council. Though the Council co-operates with the State Institutes, the Institutes are free to determine their own constitutions and their own programs.

In 1955 the active staff of the Council, with its headquarters in Melbourne, numbered ten professional persons, and fourteen secretarial, clerical, and sales staff.

In its first year of operation the expenditure of the Council amounted approximately to £5,000. In 1956 its expenditures totaled over £51,000, and it had by that year accumulated funds amounting to almost £75,000. In 1955-56 the principal sources of income of the Council were grants from the Commonwealth Government and from each of the State Governments (totalling £10,000), sales of tests and publications, income from accumulated funds, and contributions from teachers' bodies, industry and commerce.

The Council's major activities can be classified as: (1) the conducting and sponsoring of research into educational problems at all levels, (b) the provision of library, information, and consulting services to students and research workers in education and related fields, (c) the preparation and distribution of educational and psychological tests, and (d) the publication of reports and accounts of research and other studies in education.

Between the years 1930 and 1955 the Council's staff, in addition to conducting many minor studies, carried through ninety-three major research studies and investigations each of which resulted in the preparation of a report or test of wide distribution, or which was required by an outside agency for a particular purpose. Many of these studies have been concerned with the preparation and standardization of Australian tests of intelligence and Australian tests in the basic school subjects, together with statistical studies of these tests. In addition, however, a good many titles such as the following appear in the list of A.C.E.R. researches: study of Australian correspondence education, sponsorship of the Carnegie Corporation survey of Australian libraries, investigation into educational aspects of youth-adult employment, survey of adjustment of youth by four investigators sent to Europe and the United States, studies of the spoken vocabulary of pre-school children and of the written vocabulary of ten-year old children, and survey of the relative extent and difficulty of curricula and examinations in each State for children of 11 plus and 14 plus years. During the war years much of the Council's research work was done for or in conjunction with the Armed Services and various Government Departments.

A comprehensive review of Australian research studies during the period 1950 to 1956, with complete bibliographical references, has been provided by W. C. Radford in the American Educational Research Association's *Review of Educational Research*, XXVII, 1, (February, 1957). Readers interested in specific Australian investigations, including A.C.E.R. studies, should consult that article. Brief reference might be made here, however, to one important recent A.C.E.R. study on a topic which is of considerable current interest in Canada.

Toward the end of 1955 Dr. H. H. Hohne completed an intensive investigation into the university careers of the students who entered the University of Melbourne in 1943 and 1944. The study was designed to determine whether a battery of psychological tests given to students and evaluated together with matriculation examination results would significantly increase the prediction of academic success over prediction based on matriculation results alone. Valuable data on rates of wastage in the University also emerged from the study.

A battery of psychological tests administered to all students entering the University of Melbourne in 1943 consisted of: ACER Adult Test B40 (Intelligence); ACER Speed and Accuracy Test; ACER Mechanical Comprehension Test; ACER Number Test; Revised Minnesota Paper Form-Board Test; Verbal Test; Group Rorschach (screen version); Woodworth-Martin Personal Inventory. A slightly modified battery was administered to students entering in 1944. In each year an Entrance Score was calculated, based on the student's results in the matriculation examination.

Amongst the principal findings of the Hohne study were these: (1) Psychometric tests do not add appreciably to the predictive power of the matriculation examination, but, above the minimum levels, do help to identify students with steeply rising chances of success. They could not be used with confidence to reject more than a small number of intending students who passed the matriculation examination. (2) Prediction from the present types of entrance examination, or from psychometric tests, is always uncertain when factors which affect success within the university, such as teaching and examination practices, cannot be controlled. (3) Of the full-time students entering the Faculty of Arts in 1943, 68 percent had graduated by April, 1951; of the 1944 entrants 65 percent had graduated. When full-time and part-time students of the Arts Faculty were considered together, the wastage rate was under 50 percent. (4) Of the full-time students entering Scientific Faculties in 1943 and 1944, 71 percent had graduated by 1954. When full-

time and part-time students of the Scientific Faculties were considered together, the wastage rate was slightly under 40 percent.

The foregoing paragraphs have given some indication of the types of research conducted by the staff of A.C.E.R. Grants approved toward investigations carried on by other than Council staff during the period 1930 to 1955 totaled 220, representing a total expenditure of £20,000. In recent years there has been a marked decline in requests for aid by individual investigators, largely because of increased facilities for research elsewhere. This decrease has been accompanied by a corresponding increase in staff research, and in services offered by Council staff.

Providing information, consultant, and training services has always been an important function of the Council. The Council's library makes about 2,400 loans a year to borrowers in all States. New books are brought to the attention of educationists and librarians. Requests for information are received on many aspects of education in Australia and in other countries. Members of the Council's staff have supplied most of the articles on Australia which have appeared over the years in the English *Yearbook of Education*, while the Director represented Australia at the first international conference on educational research held in United States in 1956. Between 1930 and 1955, 21 teachers from all States have been nominated by State education departments for training at Council headquarters, with their salaries paid by the Council during the term of seconded duty with the Council. This scheme has resulted in the establishment of a core of trained educational research workers distributed throughout the country.

Quite early in its history the Council began to devise objective tests of ability and attainment and to adapt tests from other countries. A number of Australian-wide standardizations have been conducted, with national norms being made available. A special Test Division was established in 1947 to handle construction and distribution of tests; it now distributes about 2 million test copies a year. Of the 115 different tests which have been published by the Council between 1930 and 1955, 52 tests were constructed by the Council staff, 14 were constructed by other Australian authors, and 49 were tests first published overseas and then adapted for use in Australia. The Australian teacher or psychologist probably has a wider range of testing material, constructed or adapted specifically for use in his own country, available to him than has his counterpart in any other country except the United States.

Its constitution also lists as one of the Council's objectives the publication of the results of research and other investigations approved by the Council. By 1955 the Council had made 122 such

publications, 66 of which were items in its *Educational Research Series.* The *Review of Education in Australia* has appeared four times, while the publication of a new journal, the *Australian Journal of Education,* has recently been sponsored by the Council.

The A.C.E.T. is continuing its policy of research into testing procedures and their refinement, and has recently concentrated upon the development of objective tests for the tertiary level. An extensive survey of courses of study and attainment in English and Arithmetic, Hohne's intensive study of success and failure in university, and Keat's work on test scores, their distribution, and appropriate statistics related to them, are examples of recent studies which have influenced educational policy in various quarters. The particular interests of A.C.E.R. at present are to complete an enquiry into age of admission to primary schools and promotion policies in Australia, to get under way a comprehensive enquiry into inspection in primary schools, and to plan a program of research into secondary education which will be genuinely collaborative.

The Australian Council for Educational Research provides an outstanding example of a national but independent educational research organization which is playing a vital role in the educational development of a young country. Perhaps the most significant feature of recent years in A.C.E.R. activities has been the increasing amount of collaborative work which has been done between A.C.E.R. the State departments, and the universities.

State Departments of Education

Each of the six State departments of education has a research branch and at least one research officer, although organization and roles differ from State to State. The first department of education specialist in research and psychology was appointed in 1922. Appointment of full-time research officers in the other States followed in 1935, 1938, and in the 1940's. In New South Wales, under the Principal Research and Guidance Officer, there is a Chief Research Officer with four senior research officers, five research officers, and the departmental librarian; the organizational plan for the division provides for the senior research officers to specialize in curriculum, general research, visual education, and publications.

In addition to the work involved in providing information required by the administration for its day-to-day decisions, other research problems of a more long-term nature are dealt with by the State research branches. All research offices have been used extensively to predict school populations and building and teacher needs.

In Queensland and New South Wales, especially, there is an increasing tendency to use the research office to appraise the effects of administrative policies. In Queensland, for example, there is at present being conducted, under fairly strict control, an experiment appraisal of a far-reaching change in primary school methods of teaching reading in that State. Other such evaluative studies in Queensland have included investigations into long-term comparative standards in the basic subjects, the effectiveness of selection procedures, and the improvement of guidance instruments. It is worthy of special note that this State department of education has frankly made the results of its research work readily available for all to read in a series of bulletins, and also in the *Queensland Gazette*. Too often little of the research work done by a state (or provincial) department of education becomes known outside the walls of the department. This forthright publication of its evaluative studies by the Queensland research office represents perhaps the most significant recent development in Australian State department research.

Examples of the many studies reported as under way in 1956 in other State departments include: in New South Wales — an examination of the social attitudes of pupils in co-educational schools compared with those of pupils in single-sex schools; comparative studies of pupils in comprehensive and specialist schools in New South Wales; and a comparison of the performance of secondary pupils by class teachers with that of pupils taught by subject teachers. In Victoria — a study of acceleration and retardation in state primary schools in relation to age of entry; a method of teaching spelling based on individual written assignments; and special equipment and teaching aids for handicapped children. In Western Australia — the prediction of success in pharmacy examinations; the development of writing scales; and an historical account of the forces that have moulded the educational institutions of Western Australia.

The Commonwealth Office of Education

When the Commonwealth Office of Education was established in 1945 it set up a Research Section. Through its bulletin surveying particular aspects of education, its annual reports to the International Bureau of Education and UNESCO, its predictions of enrolments, its studies of language teaching to immigrants, its preparation of readers for native children, its research work on the hard of hearing, and its studies of the university progress of Commonwealth Scholarship winners, it has made a great deal of background information available on Australian education. Examples of studies reported in 1956 by the Commonwealth Office included:

construction of tests in English for Asian students, future educational needs of the Northern Territory, a survey of research into causes of failure in schools, and a survey of education in Indonesia.

The Universities

Since World War II there has been a decided increase in Australia in the quantity and quality of educational research done under the auspices of university departments of education and psychology, both of staff and by postgraduate students. There has been a considerable increase in the actual numbers of students proceeding to post-graduate degrees, with an accompanying growth in numbers of staff, while in two or three universities educational research fellows have been added to staff. The Ph.D. is now available in Australia for students in education, and the M.Ed. is available at several of the universities. Psychology and history departments are also contributing research on or related to education, while the teachers' colleges also are doing some research.

Some Negatives

The Canadian observer would surely be justified in concluding that for a young and isolated country Australia has gone a commendable distance in its organization of, and accomplishments in, educational research. He might profitably consider some implications of Australian experience for our own work in this field. Lest the impression be left that the Australians are smugly complacent about their achievements, and at the same time to indicate some directions in which future developments in that country can move, a few observations concerning Australian research may be quoted directly from the previously-mentioned article by Dr. Radford in the last *Review of Educational Research.* In various places he comments:

> Relatively little work is published in book form; there is no journal devoted specifically to research; what appears in print is restricted in quantity and is often presented in too condensed a form for proper appraisal. There is no central repository for abstracts nor any microfilming service for distribution overseas of unpublished research studies; Australia has few trained research workers engaged in research since many of those with the necessary training move into administrative work in which time and opportunity for research are limited. University staffs have varied in productivity, and most of their time is spent in supervising and guiding students. There is an absence of studies of the administrative process; little work of a sociological nature. Little has yet been attempted in integrating completed research work; it is still true that Australian research is not strongly influencing Australian practice; the majority of the work done is survey, and the use of the more recently devised technics of research is rare.

Australia's achievements and limitations in education research will both have lessons for Canadian readers.

AN ANALYSIS OF THE SELF-CONCEPT OF GRADE NINE STUDENTS

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The concept of self has of late been engaging the renewed attention of a number of psychologists. The *self-concept* may be defined as a system of feelings, attitudes, and values which the individual has accepted as definitions of himself. In this study the self-concept is a composite self-image obtained from a list of self-referent statements selected from self-descriptive essays written by adolescents.

Though there have been a number of studies reported in current psychological literature dealing with self, most of the research has dealt with the self-concept of college students and little has been reported on adolescents in junior high school. In discussing the self-concept Wattenberg[1] says: "In a field which is in its infancy, the amount that deals specifically with the teen years is slight. Most of the available material on the subject has grown out of clinical observations."

Since the school is one of the determiners of a young person's personality in the development of desirable traits, values, and attitudes, it might well concern itself with the person's concept of himself. It might attempt to reduce as far as possible the carry-over of unhealthy attitudes toward self that young people bring with them into adult life. Jersild[2] sees the need for doing something in the educational program to help children and youth to develop realistic attitudes of self-acceptance. In a more recent publication Jersild points out that "When an adolescent has an unrealistically low estimate of himself he fences himself in and does not exert maximum effort."[3] On this assumption, educationists should examine the implications of accepting the self-concept as a basic concept in education. By helping the young person to gain an insight of himself, we can help him gain a better understanding of himself and assist in improving his adjustment.

The self-concept is believed by many to be one of the most important variables in learning. It is well known that attitudes affect learning. Speaking of attitudes Hobbs[4] states:

> But if one samples broadly enough of such attitudes, one is dealing with the self, it would seem, as a potent factor in learning. Why do girls consistently do better in some subjects than boys? Why can a delinquent lad learn so much about guns and so little about Geometry? Why do some

[1] William W. Wattenberg, **The Adolescent Years, p. 326.**
[2] **Arthur T. Jersild, In Search of Self, p. 5.**

people learn to be good citizens so much more readily than others? There are doubtless many factors involved, but perhaps the individual's concept of himself is one of the most important variables.

An examination of the self enables an individual to gain feelings of self-acceptance, to arrive at a realistic picture of himself, and to better realize his potentialities in relation to his world.

A number of studies, such as those conducted by Rogers[5] and Bills[6], have demonstrated the importance of the self-concept in personality adjustment.

The Problem and Research Design

The purpose of this study was to measure the self-concept of grade nine students. Secondary aims included the investigation of relationships between areas of the perceived self, relationships between self-concept and intelligence, and evidences of sex differences.

From self-descriptive essays on the topics, "What I Like About Myself," and "What I Dislike About Myself," 246 self-referent statements were selected and classified into four broad areas of self-perception: mental, personal, social, and physical. These 246 statements, under the assessment of five judges, were reduced to 77 statements, these constituting the research instrument. A scoring system was developed by having the 77 statements read by a criterion group of fifty-three grade nine students to determine the desirability or undesirability of feelings or values expressed by each statement. The statements may thus be designated as approved or unapproved.

The instrument, referred to as *self-concept rating schedule,* was administered to over 400 grade nine students. The subjects rated themselves on each item of the schedule as follows:

T	true of me—a good description of me
MT	mostly true of me—but not completely true
NA	neither true nor false of me—not applicable to me
MF	mostly false of me—like me only to a small extent
F	false of me—not like me at all.

About one week before the administration of the schedule the subjects were given the Otis Self-Administering Test of Mental Ability, Intermediate Form A.

The subjects were grade nine students from four Edmonton junior high schools. Usable data were obtained from 384 subjects, 190 male and 194 female. The range of I.Q.'s was 64 to 131, with

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[3]Arthur T. Jersild, **The Psychology of Adolescence,** p. 105.

[4]Nicholas Hobbs, "Guidance and Some Recent Developments in Psychological Theory," **Canadian Journal of Psychology,** (June, 1949), p. 68.

[5]Carl V. Rogers, **Client-Centered Therapy.**

[6]Robert E. Bills, "Progress of Research with the Index of Adjustment and Values," Unpublished Manuscript, University of Kentucky, 1953, (Mimeographed).

a mean of 110.7 and standard deviation of 10.5. The mean for boys was 108.6 and for girls 112.5. Mean ages for boys and girls were 14 years 11 months and 14 years 7 months respectively. The age range was 12 years 8 months to 18 years.

ANALYSIS OF DATA

Areas of Perceived Self

Each statement in the schedule was allocated to one of four areas of self-perception: mental (four items), personal (thirty-two items), social (twenty-six items), and physical (fifteen items). The scores for each area, as well as total scores on the instrument, were held to represent measures of self-acceptance in terms of the group ideal. The group ideal consists in the evaluation of the desirability or undesirability of feelings or values expressed by each statement as rated by the criterion group of 53 students.

The instrument was readministered to two classes of students in one school eight days after the first administration. The test-retest product-moment coefficient of correlation calculated for fifty-seven subjects was .91 with a standard error of .01. The correlation coefficient differs from zero at less than the .001 level of confidence. Therefore, the data show that acceptance of self scores are reliable measures, or in other words, what is being measured is measured consistently.

Product-moment correlation coefficients between the areas of the perceived self are shown in Table I. The largest correlation coefficient of .77 indicates that the highest relationship was between the areas of the personal self and the social self. The lowest relationship was between the areas of the physical self and the mental self. All inter-correlations were found positive, and all significant at less than the .001 level of confidence.

Table I

INTERCORRELATIONS BETWEEN THE AREAS OF SELF-ACCEPTANCE

AREA	MENTAL	PERSONAL	SOCIAL
PHYSICAL	.31 $\pm$ .11	.55 $\pm$ .10	.60 $\pm$ .09
SOCIAL	.40 $\pm$ .11	.77 $\pm$ .06	
PERSONAL	.52 $\pm$ .10		

Sex Differences

The mean area or sub-test scores were higher for female subjects in the personal, social and physical area, and only slightly lower in the area of the mental self. A summary of the differences is given in Table II. No significant sex differences between the means were found in the areas of the mental self and personal self. The differences between the means in the social area were found to be significant at the .01 level of confidence, in favor of girls.

TABLE II

AREA OF SELF-ACCEPTANCE MEAN SCORES, STANDARD DEVIATIONS, STANDARD ERRORS, DIFFERENCES BETWEEN MEANS, AND SIGNIFICANCE OF DIFFERENCES BY SEX

AREA	GROUP	MEAN	S	S_M	D_M	S_D	D_M/S_D	SIG.
MENTAL	Female	6.1	7.6	.566	—0.9	.782	—1.15	
	Male	7.0	7.7	.561				
	Total	6.6	7.6	.388				
PERSONAL	Female	77.9	36.2	2.60	0.6	3.68	.116	
	Male	77.3	36.0	2.61				
	Total	77.6	36.2	1.84				
SOCIAL	Female	100.6	33.0	2.37	8.1	3.45	2.35	.01
	Male	92.5	34.5	2.50				
	Total	96.6	33.8	1.72				
PHYSICAL	Female	38.0	25.6	1.84	8.9	2.69	3.31	.001
	Male	29.1	27.0	1.96				
	Total	33.6	26.7	1.36				
TOTAL SCORES	Female	222.4	87.3	6.27	17.4	9.07	1.92	.03
	Male	205.0	90.3	6.56				
	Total	213.7	89.4	4.56				

NOTE:
- S — standard deviation
- S_M — standard error of mean
- D_M — difference between means
- S_D — standard error of the difference between means
- D_M/S_D — critical ratio
- Sig. — significance of difference between means

In the area of the physical self the difference, also in favor of girls, was significant at the .001 level of confidence. For the total scores the differences between the means was significant at the .03 level of confidence, again in favor of female subjects. It can be said with

a certain amount of assurance that sex differences in self-acceptance scores are significant. In addition, these differences show that girls are generally more accepting of self than boys are, particularly in the areas of the social self and the physical self.

To obtain additional evidence of sex differences, responses to individual items were analysed. Percentages of responses to items were calculated, and differences between combined *"true"* and combined *"false"* responses were examined. These differences were independent of group valuation and give measure of differences in self-concept rather than measures of acceptance of self. For a number of statements in the areas of the personal, social, and physical aspects of self the differences were significant at less than the .003 level of confidence. No significant sex differences were found in the area of the mental self, possibly because of the small number of items included.

A significantly larger percentage of girls than boys felt that the following statements described them well:

Religion plays an important part in my life. (M37, F66)
My feelings are easily hurt. (M36, F50)
I am a hard worker. (M65, F77)
I am easily embarrassed. (M39, F53)
People can depend on me. (M86, F95)
I have patience with others. (M68, F91)
My teachers like me. (M53, F76)
I am helpful to others. (M79, F90)
I get along with members of the opposite sex. (M87, F94)
I am respected by others. (M58, F75)
I am courteous. (M87, F92)
I wear my clothes well. (M77, F90)
I am attractive to members of the opposite sex. (M42, F53)
I am a good dancer. (M37, F73)
I have good taste in clothes. (M75, F93)
I have nice hands. (M41, F54)
I am neat and tidy. (M72, F87)
I am just the right height. (M65, F75)

Percentages of *true* responses for each sex (M for male and F for female) are given in parentheses following each statement. Of the above statements the majority express feelings or values pertaining to aspects of the social and physical self, with only three statements pertaining to aspects of personality and character.

A larger percentage of girls than boys said that these statements do *not* describe them well:

I am better than others. (M65, F82)
I make a bad impression on people. (M67, F81)
Most people avoid me. (M63, F77)

Percentages of *false* responses by sexes are given in parentheses.

On the other hand more boys rated as *false* or *mostly false* the following stateements:

I am stubborn. (M59, F51)
I am moody. (M68, F60)
My feelings are easily hurt. (M60, F50)
I am nervous (jumpy). (M73, F64)

Significant differences in favor of girls in the area of the social self may be interpreted as reflecting the higher degree of social integration that is quite common among girls of this age group as compared with boys. Differences in the physical area may be due to the differential rate of development between boys and girls. In addition, some of the statements, particularly in the physical area, might apply more to girls than to boys.

Self-Concept and Intelligence

Product-moment correlation coefficients which were calculated between raw scores on the Otis Test of Mental Ability and self-acceptance scores for the areas and for the total scores are given in Table III. No significant relationships were found. Though mental ability, as measured by the Otis Intelligence Test, appeared to have no relationship to self-acceptance, it is conceivable that an individual's concept of self may have some bearing on learning or achievement. This point was not investigated.

TABLE III

PRODUCT-MOMENT CORRELATION COEFFICIENTS BETWEEN RAW SCORES ON THE OTIS SELF-ADMINISTERING TEST OF MENTAL ABILITY, INTERMEDIATE A, AND AREA AND TOTAL SELF-ACCEPTANCE SCORES for 384 SUBJECTS

AREA	MENTAL	PERSONAL	SOCIAL	PHYSICAL	TOTAL
OTIS RAW SCORES	.26 ± .12	.17 ± .12	.11 ± .13	— .06 ± .14	.09 ± .14

The Self-Concept of the "Typical" Grade Nine Adolescent

Of the seventy-seven statements in the schedule, fifty-two were rated by the criterion group as expressing feelings or qualities that are desirable or approved. This group of statements reflects an approved concept of self when rated *true* or *mostly true*. To select the statements that were most representative of self-descriptions of adolescents, ratios of combined *true* to combined *false* percentage were calculated for each statement. These ratios were used to rank order the statements. Twelve of the most frequently preferred statements were selected as giving the self-concept of the theoretical "typical" adolescent. Percentages of *true* responses are given in parentheses by sex.

The top-ranking statements below give a composite self-picture of the grade nine adolescent:

I am honest. (M94, F99)
I get along with members of my own sex. (M97, F96)
I am truthful. (M92, F96)
I am kind. (M89, F95)
I am loyal to my friends. (M94, F96)
I am capable of looking after myself. (M96, F95)
I like my parents. (M97, F95)
I get along with others. (M97, F95)

The remaining four of the preferred statements for girls were:

People can depend on me. (95)
I get along with members of the opposite sex. (96)
I am a good sport. (91)
People who know me like me. (86)

For boys the remaining four of the twelve preferred statements were:

I am a happy person. (95)
I have many friends. (91)
I am likeable. (79)
I am considerate of others. (74)

The least preferred statements for both sexes were those which elicited high frequencies of *false* and *most false* responses. Percentages of *false* responses are given in parentheses following each of the statements:

I am attractive to members of the opposite sex. (M19, F14)
I am good at arguing. (M19, F20)
Religion plays an important part in my life. (M44, F21)
I settle down to work easily. (M26, F21)
I am good-looking. (M15, F17)
I make up my mind easily. (M26, F25)
I am just the right weight. (M29, F26)
I am attractive. (M13, F21)
I have nice hands. (M27, F27)

Among the twelve less preferred statements for girls were also the following:

I am good at sports. (20)
I am intelligent. (23)
I have good eyesight. (28)

Large percentages of boys rated these approved statements *false* or *mostly false:*

My teachers like me. (16)
I am just the right height. (27)
I am a good dancer. (44)

The feelings or values expressed by approved high-ranking statements which were most preferred were mainly those pertaining to character, personality, and social relationships. Most of the approved low-ranking statements pertain to aspects of physical

appearance. Friendship, honesty, truthfulness, and ability to get along with others are not only valued highly in adolescents, but also appear typical of attributes which the adolescents said they possess. There appeared to be more concern with the physical aspect of self than with the other aspects.

Statements that were rated by the criterion group as expressing feelings of undesirable values reflect a negative self-concept if rated *true* or *mostly true*. The following six statements were those most seldom rated as true; or conversely most often rated false. In parenthesis appear the percentages of *false* rating for boys and girls.

Most people avoid me. (M76, F87)
I am better than others. (M65, F82)
I make a bad impression on people. (M69, F81)
I am a lonely person. (M84, F84)
I am clumsy. (M73, F79)
I am a disappointment to my parents. (M75, F76)

A number of unapproved statements elicited high percentages of combined *true* and *mostly true* responses. Many boys and girls felt that they can't stand criticism, that they think slowly, and that they worry about their health. About thirty-five per cent of the girls felt that they are stubborn, and that they daydream much. Forty per cent of the boys felt that they were restless, and that they envied others. Almost sixty per cent of the boys felt that there is nothing outstanding about them.

For a large number of statements high percentages of ratings were in the desirable direction. For a fewer number of statements marked percentages of ratings were in the undesirable direction. Most approved statements drew higher percentages of favorable responses than did unapproved statements. Some statements elicited high percentages of *not-applicable* responses. Unapproved statements generally drew more *not-applicable* ratings than did approved statements. This might be interpreted as indicating that the subject is on the defensive. On the other hand, it may be that the subject was unable to give the desired information, or that he did not understand the statement.

Summary

In evaluating the results of the study it is important to point out that conclusions reached may not apply outside the group studied, and that the self-concept analysis is limited to the seventy-seven statements of the research instrument. Furthermore, studies in perception of self are exploratory in a field that is in its infancy. Hence, there are limitations, such as, inconsistencies of present

theory, lack of external validating criteria, and the difficulty of treating subjectively-obtained data.

The study yielded clear-cut data and suggests that it is possible to construct helpful objective instruments that can be employed to obtain evidence to test hypotheses related to self-functions. The construction of a research instrument from self-referent statements selected from self-descriptive essays appears to be a feasible method, although there is no assurance that all the important aspects of self-hood can be obtained from student essays.

The high test-retest reliability shows that self-acceptance scores on the schedule are reliable measures. The range of these scores, and the standard deviation obtained, indicate that the schedule discriminates between individuals. High positive relationships were found between the four broad areas. The relationships between the areas of the social and personal aspects of self were highly significant.

Significant sex differences were found for mean self-acceptance scores in the social and physical areas, and for the means of total self-acceptance scores. Strong evidence was obtained that girls were more self-accepting than boys, particularly in the areas of the social self and the physical self. Analysis of responses to items produced further evidence of significant sex differences in all areas except the mental area. Most of the differences were in favor of girls. Further study of sex differences might prove both interesting and fruitful.

The presence of significant relationships between intelligence and self-acceptance was not supported by the data. An investigation of the relationships between self-concept and learning might be a rewarding follow-up to this study.

The most valued aspects of self were those relating to qualities of personality, character, and interpersonal relations, and it was those values that both boys' and girls' groups said they possessed. The subjects were less positive about the physical self. This might mean that there is more concern about physical aspects of self.

Disapproved statements appeared to have been rated differently from approved statements. They not only drew more unfavourably-directed responses, but they also elicited more non-commital responses. Is it possible that disapproved statements might be more discriminating than approved statements? A study of differences of response on this point might prove rewarding.

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FURTHER EVIDENCE ON THE CONTROL OF INDIVIDUAL DIFFERENCES IN THE CLASSROOM

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The Problem

Students of education must be receptive to the findings of research. They must, however, never lose sight of the fact that the truths of all science are, in degree, operational, tentative, and subject to constant revision in the light of new evidence. One of these truths, which has received continuous reinforcement over the past decades, relates to the nature and extent of individual differences in ability and achievement in the ordinary classroom. A related finding, which has less experimental support, maintains that these differences in ability and achievement are highly resistant to regulation and control. The schools have accepted the existence of individual differences but have shown their scepticism concerning the second finding by use of a number of devices aimed at securing greater homogeneity of ability and achievement in the classroom.

Recent large sample studies of intelligence and achievement in Alberta provided a body of data which permitted further exploration of these problems in the type of situation which occurs in the ordinary elementary and junior high school. The following hypotheses were to be tested:

First: that individual differences in intelligence and achievement in a school of the usual size are comparable with those revealed in large sample studies.

Second: that these differences are not subject to marked reduction through conventional or unconventional procedures designed to achieve a greater degree of homogeneity.

Related Studies

The evidence in support of the extent of individual differences is impressive. Wrightstone's[1] study of the achievement of New York children revealed spreads of five grades in the achievement in reading and spelling of grade three children, and spreads of as much as eight grades in junior high school. The Alberta studies[2]

[1] J. W. Wrightstone, "Analysis of Intelligence and General Achievement, Third Grade Classes (New York City)," March-May 1949, Final Summary Report (typewritten copy). New York: **Bureau of Reference, Research and Statistics,** New York City.

[2] G. M. Dunlop, S. Hunka and H. Zingle, "Individual Difference in Alberta Schools." **Alberta Journal of Educational Research** (December, 1955), pp. 5-15.

revealed a spread of intelligence quotients of eighty I.Q. points in grade eight in a sample of 1044 pupils, and of eighty-three in a sample of 784 grade seven pupils. The range of grade scores in grade eight arithmetic was 6.7 grades. The spread of grade scores in grade seven was as follows: reading 6.3 grades, language 8.7 grades, and spelling 9.5 grades.

Evidence relating to the effects on spread of ability and achievement of various devices calculated to reduce heterogeneity are less numerous. Cook[3] reports that when pupils are grouped in X, Y and Z fashion on the basis of an achievement test weighted heavily in the direction of reading and arithmetic there was a reduction of about twenty per cent in reading and arithmetic variability. This reduced the spread of achievement in grade six children from 8 years to 6.4 years with less impressive reduction in variability in other subjects. In a summary of existing evidence Otto[4] reports that in grades organized into three ability groups variability in achievement is about 83 per cent as great as in unselected groups, and in classes organized into two ability groups variability in achievement is about 93 per cent as great as in unselected groups. He adds that these percentages are reduced to about 74 and 84 respectively if the plan of ability grouping is accompanied by a multiple track of promotion. The Alberta studies revealed an average range of intelligence of 52 I.Q. points in eleven ungrouped grade eight classrooms, as opposed to a range of 80 I.Q. points in the total sample, and an average range of arithmetic scores of 5.0 grades as opposed to the sample range of 6.7 grades. In a companion study at the grade seven level the average range of reading achievement in a single classroom was 5.0 grades as compared to 6.3 grades in the entire sample. In language the average spread of grade scores was 4.6 grades, instead of the 8.7 grades encountered in the sample. In spelling the spread was 6.0 grades as compared to the sample spread of 9.5 grades.

Two factors are involved in the reduction of the heterogeneity of ability and achievement. It is obvious that reduction of sample size to that of the enrollment of the ordinary classroom will normally reduce grade range in achievement. What is of immediate concern is the effect of various devices calculated to result in more homogeneous grouping on the variability of intelligence and achievement in the classroom.

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[3]Walter W. Cook, "Grouping and Promotion in the Elementary School," **Series on the Individualication of Instruction,** Number 2, University of Minnesota, Minneapolis, 1941.

[4]Henry J. Otto, "Elementary Education." **Encyclopedia of Educational Research,** Revised Edition. pp. 367-382. Edited by Walter S. Monroe. New York: Macmillan Co., 1952.

The Plan

To reduce the problem to the level of every day practice in the ordinary classroom certain assumptions were made. In the usual junior high school a principal might expect to have four classes of thirty-five pupils each at each grade level. From the Alberta sample previously used in a survey of intelligence and achievement in the language arts at the grade seven level 140 pupils were randomly selected as the grade seven population of our hypothetical junior high school. Next the group was divided into four classes, successively, in terms of, first, intelligence, then achievement in reading, then in language, and finally spelling. In each case a study of the reduction in the spread of uncontrolled variables was made for the class of 35 pupils which ranked highest in the controlled variable. A similar study was made in the grade eight group where the variables in question were intelligence, Vocabulary and Fundamental Knowledge, Computational Skills, Problem Solving, and Total Arithmetic Score. Again the reduction in spread of scores of the uncontrolled variables was noted.

The Intelligence-Language Arts Results

The entire 140 grade seven pupils were randomly selected from the larger sample of 787 children. Table I reveals the expected wide range in intelligence and achievement of the group. The range of I.Q. scores, and achievement expressed as grade score is

TABLE I

MEAN, VARIABILITY AND RANGE OF INTELLIGENCE AND ACHIEVEMENT OF 140 RANDOMLY SELECTED GRADE SEVEN PUPILS

Factor	Range	Mean	Standard Deviation
I.Q.	71 (63-134)	105.93	12.967
Reading)	6.0 (5.0-11.0)	8.21	1.197
Spelling) Grade	6.7 (4.8-11.5)	8.71	1.389
Language) Score	5.9 (5.1-11.0)	9.20	1.1585

less than in the original large sample, which is attributable, in all probability, to the diminished number of pupils involved. Table II reveals sharply lowered ranges of grade scores in reading, language and spelling, when the group was made homogeneous with respect to intelligence to the extent that the brightest thirty-five children are included. The reduction in range of grade scores in reading was from 6.0 years to 3.4 years, a contraction in variability

TABLE II

MEAN, STANDARD DEVIATION AND RANGE OF GRADE SCORES OF THIRTY-FIVE GRADE SEVEN PUPILS SELECTED BECAUSE OF SUPERIOR INTELLIGENCE

Factor	Range	Mean	Standard Deviation
I.Q. (C.)	18 (116-134)	123	4.526
Reading)	3.4 (7.6-11.0)	9.5	.8216
Spelling) Grade	3.3 (8.2-11.5)	9.6	.9247
Language) Scores	1.9 (9.1-11.0)	10.1	.5046

in excess of 43 per cent. The range of grade scores in spelling was reduced from 6.7 years to 3.3, approaching 50 per cent. The spread of scores in language was reduced from 5.9 grades to 1.9, a reduction of over 66 per cent. These reductions in range of grade scores in a class selected because of homogeneity in intelligence are so much greater than those previously reported that they warrant serious consideration. One factor must be recognized. The reduction in variability is partially accounted for by the reduction in sample size. Garrett suggests that the reduction of a sample from 200 subjects to 50 reduces range from 3.0 S.D. to 2.5 S.D. or .5 S.D. If we use this rough estimate on the reduction in range of reading scores we would have 1 S.D. or .82 grades accounted for of the total reduction of 2.7 grades leaving 1.88 grades of the reduction attributable to other causes, one of which would be the fact that the group was homogeneous in terms of intelligence. Applying the same procedure to the reduction in range in language and spelling, we find that 3.5 grades and 2.48 grades of the reduction in range of scores are not accounted for by the reduction in sample size, and may be the result of homogeneous grouping.

Table III presents an analysis of the spread of intelligence and achievement in language and spelling in a class composed of children who are superior in reading. It will be noted that the range in I.Q. is reduced from 71 I.Q. points in the larger sample to 33 I.Q. points, a reduction of almost 54 per cent. The reduction of range of scores in language and spelling is 67.8 and 50.7 per cent.

When the class was made somewhat homogeneous by using the thirty-five pupils with superiority in spelling, it was anticipated that there would be less reduction of range of scores due to lower correlation of spelling and academic echievement in other subjects. This expectation was realized in intelligence where the range rose

to 45 I.Q. points, a reduction of 36.6 per cent, and in reading where the reduction was approximately 28 per cent. However, the range of grade scores in language was sharply reduced by 4 grades, or 67.8 per cent.

The next step was the selection of a class of thirty-five pupils who demonstrated superiority in language. Table V gives the

TABLE III

MEAN, STANDARD DEVIATION AND RANGE OF GRADE SCORES OF THIRTY-FIVE GRADE SEVEN PUPILS SELECTED BECAUSE OF SUPERIORITY IN READING

Factor	Range	Mean	Standard Deviation
I.Q.	33 (101-134)	119	8.9906
Reading)	1.9 (9.1-11.0)	9.8	.4793
Spelling) Grade	3.3 (8.2-11.5)	9.7	.9296
Language) Scores	1.9 (9.1-11.0)	10.0	.4962

TABLE IV

MEAN, STANDARD DEVIATION AND RANGE OF GRADE SCORES OF THIRTY-FIVE GRADE SEVEN PUPILS SELECTED IN TERMS OF SUPERIORITY OF SPELLING

Factor	Range	Mean	Standard Deviation
I.Q.	45 (89-134)	114	11.073
Reading)	4.3 (6.7-11.0)	8.9	.9723
Spelling) Grade	1.5 (10.0-11.5)	10.4	.4957
Language) Scores	1.8 (9.2-11.0)	10.2	.4586

TABLE V

MEAN, STANDARD DEVIATION AND RANGE OF INTELLIGENCE AND GRADE SCORES FOR THIRTY-FIVE GRADE SEVEN PUPILS SELECTED BECAUSE OF SUPERIORITY IN LANGUAGE

Factor	Range	Mean	Standard Deviation
I.Q.	48 (86-134)	114	11.621
Reading)	3.6 (7.1-10.7)	9.0	.8825
Spelling) Grade	3.9 (7.6-11.5)	9.9	.97965
Language) Scores	.9 (10.1-11.0)	10.4	.800

variability of scores for intelligence, reading and spelling. It will be noted that the pattern of marked reduction of spread of intelligence and grade scores is again evident. The spread of intelligence scores is reduced from 71 to 48 I.Q. points or 32.4 per cent. The spread of grade scores in reading is reduced by 2.4 grades or 40 per cent. The range of grade scores in spelling has been reduced by 2.8 grades, or by 41.8 per cent.

The Intelligence-Arithmetic Study

Following the assumption utilized in the language arts study a group of 140 grade eight pupils were randomly drawn from the 1044 children used in the earlier survey of achievement in Arithmetic in Alberta. The usual statistics compiled for the entire group constitute Table VI. It will be noted that here we are concerned with intelligence and the three sub-scores for Vocabulary and Fundamental Knowledge, Computation and Problem Solving, and Total Score derived from administration of the Iowa Every-Pupil Test. Since all scores save intelligence relate to Arithmetic, we have an unusual opportunity to see how closely these skills are related. The first observation concerning the entire group suggests that the marked spread of individual differences recorded in similar studies is again present and in even greater degree than in the language arts study. As in the language study a class of thirty-five pupils was chosen in terms of superiority in intelligence, and the effect of this device, in securing greater homogeneity in the four arithmetic scores, was examined. The grade spread in Vocabulary and Fundamental Knowledge was reduced from 6.2 to 4.8, in Computation from 6.4 to 3.8, in Problem Solving from 6.4 to 3.5, and in Total Score from 6.5 to 3.4. These reductions are impressive.

TABLE VI

MEAN, STANDARD DEVIATION AND RANGE OF ACHIEVEMENT IN GRADE SCORES OF ONE HUNDRED AND FORTY GRADE VIII PUPILS

	I.Q.	Vocabulary & Fund. Knowledge	Computational Skills	Problem Solving	Total Score
Range	79 (61-140)	6.2 (5.3-11.5)	6.4 (4.6-11.0)	6.4 (4.9-11.3)	6.5 (4.8-11.3)
Mean	105	8.5	8.7	8.8	8.7
S.D. (G)	11.625	1.365	1.434	1.323	1.428

When Vocabulary and Fundamental Knowledge was used as the criterion of selection the spread of I.Q. was reduced from 79 to 45 I.Q. points. The range of grade scores exhibited similar reductions: in Computation from 6.4 to 3.8 grades, in Problem Solving from 6.4 to 3.5 grades and in Total Score from 6.5 to 3.1 grades.

The pattern continued when Computation became the selective factor. Here, the range of I.Q. scores fell to 45 points, and grade scores for Vocabulary and Fundamental Knowledge to 4.8 grades, for Problem Solving 3.0 grades and for Total Score 3.4 grades. When Problem Solving was used in selection the range of I.Q. scores was reduced to 45, Vocabulary and Fundamental Knowledge to a spread of 4.0 grades, Computation to a range of 3.5 grades, and Total Score to a range of 2.9 grades. When Total Score was used as the criterion of selection, as might have been expected, it reduced the range of grade scores still more severely, Vocabulary and Fundamental Knowledge — 2.6 grades, Computation — 3.3 grades, Problem Solving — 2.7 grades.

Aside from the main problems the Arithmetic study suggests that a composite score on an arithmetic test, based on subtests measuring component abilities, is the best single agency of selection when seeking homogeneous grouping in the subject. This is not so remarkable as is the very considerable effectiveness of the component score in performing this function.

Discussion

We may now return to our two hypotheses. First, on the basis of this limited study, the existence of large individual differences is again confirmed. Note, however, that the very fact that we consider an ordinary classroom of thirty-five pupils as the unit under study diminishes the range and extent of individual differences in both intelligence and achievement from the extreme spreads encountered in the large sample studies. Ranges of 80 I.Q. points in large sample studies become ranges of 45 to 50 points. Spread of grade scores as measures of achievement drops from eight and nine grades to six grades in individual unselected classrooms. This is attributable to the recognized statistical fact that reduction in sample size results in a decrease in variability of scores. Since classrooms rarely exceed thirty-five pupils, this reduction in range in intelligence and achievement has already occurred, and the frightening ranges of ability and achievement of large sample studies become a little unrealistic. However, even the reduced range of grade and intelligence scores encountered in the ordinary classroom are formidable enough and must be reckoned with.

Our second hypotheses raised for consideration the generalization that selective devices for securing greater homogeneity of

pupils by use of criterion scores were of limited value as they rarely reduce variability by more than twenty per cent. In the Language Arts Study, grouping in terms of intelligence reduced variability by 43, 50 and 66 per cent in reading, spelling and language. When reading scores became the criterion of selection the reduction in range of grade score was 54, 67.8 and 50.7 per cent. When the poorest criterion, spelling, was used the reductions were 36.6, 28 and 67.8 per cent. When language was used for selection the reductions in spread of grade score were of the order of 32.4, 40 and 41.8 per cent. Surely these reductions in heterogeneity are larger than earlier studies suggest, and an indication of the promise which lies in further studies of prediction. The Arithmetic study confirms these findings. In particular, the Total Score criterion as the basis of selection reduced variability in Vocabulary and Fundamental Knowledge by 58.1 per cent, in Computation by 48.4 per cent and Problem Solving by 57.8 per cent.

This study illustrates the necessity for continued reflection on the relationship between accepted research findings and educational practice, even at this naive level. Its implications are listed for review:

1. Individual differences expressed in a spread of grade scores of five to eight years are found in large sample studies.
2. These differences are normally reduced in the ordinary classroom through the diminution in variability which attends reduction in size of a sample.
3. When classes are made homogeneous in terms of a single criterion score the reduction in variability in achievement within subjects seems more marked than earlier studies would indicate.
4. In view of this evidence there seems to be a need for further study of criteria of selection, and their efficiency in the reduction of individual differences in intelligence and achievement at the classroom level.

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Editorial

Psychological studies rather dominate this issue, three reports being presented. The Lent study is one of adjustment problems among high school girl students. Beginning with the terse statement that "the period of adolescence is not the happy, carefree age it is frequently supposed to be" to the last Table dealing with heterosexual problems, the reader is made progressively aware of the kind and extent of adolescent problems.

The percentages shown in the Tables relate to the total population of 425 adolescent girls and no not, because of the multiplicity of problems in certain individuals and the total absence of problems in others, add to the convenient 100%.

Obviously the categorization of problems is necessarily artificial, but within the frame-work set up it is interesting to note the high incidence of personal-psychological problems in contrast to the infrequency of mention of moral and religious problems.

Two further studies deal with the inter-personal relationships among adolescents. Munro's is a case study of high school boys, aiming at an insight into the structure of a peer group and into the factors influencing the behavior of its members. Because of the case method employed numbers are necessarily small. Nevertheless some interesting, if tentative, conclusions emerge. One is that, even in small groups, social status is recognized in establishing personal relationships, and another that boys most accepted by their peers tend to be selective of their friends, while those less popular seem to seek group approval.

The third investigation, by Brown, undertakes to assess whatever relationship may exist between one's attitude toward oneself (self evaluation) and similar evaluations of significant others, meaning in this case peers and adults who were chosen on the grounds of their significant relationship to oneself. The particular attitude chosen for study was that of dominance-submission. Curiously enough, on this scale, the self-evaluation, whether of dominance or submissiveness, was found to be reflected in the attitude imputed to others. That is to say, if a youth showed himself submissive on the scale he tended to attribute submissiveness to his significant peers and significant adults. Boys and girls showed the same propensity. Obviously, left unanswered in the question to what exent the subject under study *chose* as significant peers and significant adults persons so dispositioned as themselves.

Further to personalities, both Professors Clarke and Melsness tell of their personal experiences in travel and study.

We are grateful to Mr. Watts for his excellent review of an outstanding book on English Language Arts.

EDUCATIONAL RESEARCH IN ADMINISTRATION AND SUPERVISION

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Introduction

In the spring of 1957 the British Dominions and Colonies Program of the Carnegie Corporation awarded the writer a travel grant to study educational research at certain centres on the eastern seaboard of the United States. The purpose of this article is to describe the research in administration and supervision.

Significant research in education is currently expensive, large scale, and requires a staff (preferably a research team). Perhaps for these reasons research in administration and supervision investigated by the author was found to be supported by the Kellogg Foundation in the southeast region, and by the U.S. Office of Education or Ford Foundation grants in the northeast. This observation prompts an interesting question: can education raise, through regular channels, the funds required for significant research? The projects described extend from three to five years and involve grants ranging from $64,000 to $261,000. The professional directing staff was typically a team of three to seven professors, aided by graduate students, both paid and working on graduate studies. In the southeast these research teams typically involved educational psychologists, who were intimately associated with the basic theory, the research design, and the execution of the research projects. In some institutions, research in administration and supervision appeared to have absorbed the energies of all interested parties, so that this was the major area in which research was proceeding.

Four additional features of research in administration and supervision appear to be general. First, it is applied or action research, as opposed to pure research. The distinction intended here is that the pure researcher seeks truth, without any intent to use or apply his results; while the applied researcher seeks to influence or change practice as a result of his research findings. The second general feature of research in administration and supervision is that it is closely related to the training program for administrators and supervisors. Graduate students contribute suggestions, reactions, advice; they do field work; they contribute to theory. In turn, the researchers share with these students the purposes and

procedures of their research. In these ways, a very intimate relationship between research and training has developed. The third feature of research in this field is the carefully developed theoretical formulation, which could well be the envy of research in certain other areas. In the southeast the theory appears to stem from the phenomenological approach of Snygg and Combs[1], and an extension and application of this to education by Bills[2]. Other allied theoretical formulations [3] [4] [5] are found. In the northeast, there is no uniformity of theoretical formulation, although the same careful delineation is made by each investigator.[6] A fourth general, although not universal, feature of research in administration and supervision is its focus on personnel problems. The area of study is the man, the job, the situation, and the relationships among these. Stated in another way, the outcomes of the studies would be in selection, training and placement of administrators and supervisors.

Leadership Studies

In 1952 the University of Florida College of Education was awarded a Kellogg grant to study educational leadership of the principal. A group of staff members headed by Vynce Hines met every other Saturday morning for a period of three years to plan and execute the study, and then once a month for the following year. The first stage of this research was a study of how the principal operates in terms of behaviors. The identification of dimensions of behavior, the measurement and validation of these dimensions in the areas of the principal's relationships with individual pupils, individual teachers, the faculty, and lay (community) persons was a major task. Some twenty doctoral dissertations were planned and completed around this stage of the investigation.

Overall findings have not as yet been collated, although articles[7] describing various phases and aspects have been published.

1D. Snygg and A. W. Combs, **Individual Behaviour,** New York, 1949.

2Robert E. Bills, "About People and Teaching", **Bulletin, Bureau of School Service, University of Kentucky,** Vol. XXVIII, December, 1955, No. 2.

3Howard Eckel, "An Experiment in Teaching Educational Administration," **Bulletin, Bureau of School Service, University of Kentucky,** Vol. XXVIII, September, 1955, No. 1.

4Southern States Cooperative Program in Educational Administration, **Better Teaching in School Administration,** Nashville, McQuitty Printing Co., 1955.

5Kimball Wiles, **Supervision for Better Schools,** New York, Prentice Hall ,1955.

6Daniel E. Griffiths, **Human Relations in School Administration,** New York, Appleton Century Crofts, 1956.

7Kimball Wiles, "The Operation Patterns of Principles" **Nation's Schools,** October, 1955. Hulda Grobman and Vynce Hines, "Foes of Good Community Reations", ibid., Nov., 1955. Hulda Grobman and Lee G. Henderson, "Distance and Disaffection", **Florida Education Association Journal,** Nov., 1955. Vynce Hines and Hula Grobman, "The Weaker Sex is Losing Out", **School Board Journal,** March, 1955. Vynce Hines and Hulda Grobman, "What a Principal does, Matters", **Phi Delta Kappa,** April, 1956. Rapport in Field Research", **Ed. Admin. and Supervision,** Vol. 42, No. 7, November, 1956. "What Makes a Good Principal", **Bulletin of the National Association of Secondary School Principals,** Vol. 40, No. 223, Nov., 1956. Vynce Hines, "F Scale, Gamin, and Public School Principal Behaviour", **Journal of Educational Psychology** (in press). Vynce Hines and Hulda Grobman, "What Parents Think of Their Schools and What They Know About Then", **Bulletin of the Secondary School Principals Association** (in press).

Instrumentation for measuring identified variables has been developed and validated, including the *Principal Behavior Checklist, Bills' Index on Self, Bills' Index on Other Principals, Teacher Attitude Questionnaire, Teacher Activities Questionnaire, University of Florida "A Parent's View of the School" Questionnaire (copyright), Student Attitude Scale (printed)*, and various *Q-sorts.*

Principal findings to date, as published in the research articles mentioned above, include: (1) No relation was found between the principal's operating pattern and personality qualities measured by the California F. Scale, or G.A.M.I.N. (2) The higher the income level, education level, and the closer to school the parent lived, the more favorable the parent's evalution of the school, the more he used the school, and the more he was willing to support it. (3) When the preceding factors were held constant, parents favored democratic principal behavior, except parents whose income was below $2000. (4) When factors listed in (2) were held constant, pupils and teachers preferred democratic principal behavior, and themselves had more favorable attitudes toward education in schools which were operated democratically. (5) Women principals were generally more democratic and effective than men teachers. (6) No relation was found between the operating patterns of the principal and teacher feeling toward or interaction with the community. The second stage of this study, projected forward to 1960, is an experimental investigation of the effects of leadership training programs on the principal, on his behaviors, and through this on his pupils, teachers, and school community. A comparison of on-campus and in-service leadership training programs is proposed. The chief measuring instruments are among those described above, with perhaps refinements and additions.

Other Southern Leadership Centres

Six graduate schools[8] are cooperating to improve educational leadership in the South. An excellent example of both the team approach and a carefully developed theoretical position as a basis for action and research in found in a *Special Report of the Southern Leadership Centres*[9]. Some of the headings from the table of contents must suffice to deliniate the thinking involved: the *tentative conceptual framework; beliefs; role concepts, relationships; acceptance or rejection; decision making; social change; society; what powers the spirals?; the role of research; some research purposes;*

[8]Alabama Polytechnic Institute, University of Arkansas, George Peabody College for Teachers, University of Kentucky, University of Oklahoma, University of Texas.

[9]**Spirals of Change: A Conceptual Framework for Regional Action,** Report of a Special Committee, November, 1956, The Southern Education Foundation, 811 Cypress St. N. E., Atlanta 8, Ga. (mimeographed).

how can design aid our efforts?; building a regional research design; some research clues.

The applied nature of research in the thinking of the cooperating centres in the south is indicated in a heading from the report of the 1956 Gatlinburg Conference. The heading is "Research and Evaluation — Tools of Program Change". While these reports are specific to the region, the statement of theory, the statement of the role of research, and the cooperative design are of general, and should be of wide, interest[10].

The University of Kentucky is selected by this writer to illustrate specific institutional research, which ,it must be remembered, is set in the cooperative overall design just mentioned. The two University of Kentucky *Bureau of School Service Bulletins* previously cited are published, and describe the theoretical position and the operation of part of the leadership training program.

As noted before, this research program at the University of Kentucky is supported by a Kellogg grant. It is a deliberate and planned experiment in preparing school leaders. The design is (1) measures before training (2) training (3) measures after training. The measuring instruments include a variety of *Q-Sorts (to measure abilities, traits, self, leadership, membership, purposes of education); Bills' Index of Adjustment and Values; situational written case materials, tapes, and movies; an administrator's projective test; group process analysis; open-end interviews.* This research project started in 1955, so it is, at the time of writing, too early to report findings.

Assessment Projects

The Bureau of Reference, Research, and Statistics of the New York City Schools under the direction of Herbert A. Landry conducted studies in assessment. These studies were to develop and test methods of selecting higher administrative personnel. The researchers investigated cartoons, proverbs, ink blots attitude tests, and supervisor effectiveness scales. This research was completed in 1951. Since its nature was the development of instruments, and subsequently these were not used, this research has not been published. Research workers developing similar instrumentation should, however, know that this work has been done.

Teachers College, Columbia University, has been awarded a U.S. Office of Education grant to work in conjunction with Educational Testing Service on the problem of the development of criteria of success in school administration. This is a five year study starting in 1957. The purposes of the study are to develop criteria for the

[10]Associated Programs in Educational Administration, Director: Dr. Truman M. Pierce, Dean, School of Education, Alabama Polytechnic Institute, Auburn, Alabama.

evaluation of school administration ,to define the nature of the job of the school administrator, and to develop instruments for the selection of school administrators. The proposed steps in the study include (1) survey of current job descriptions and theoretical analysis of the school administrator's job, (2) development of test situations which represent the various aspects of the administrator's job, (3) pilot tryout and revision of the test situations, (4) administration of experimental and other tests on a large scale, (5) analysis of the data, and (6) preparation of a manual and kit of measures. It is expected that perhaps a week of testing, largely of the situational type used by the O.S.S. of the U.S. Armed Services during World War II(but more structured), will be developed. Specifically, there may be letters to answer, telephone calls (on tape), files to refer to, skits or movies to react to. In addition various non-situational tests may be given. Scoring may be in terms of types of solution rather than in terms of pass-fail. The proposed manual and kit would be useful as a *research tool* on problems of school administration, in *evaluating* courses in educational administration, and in the *selection* of candidates for advanced study in educational administration or candidates for administrative posts in large school systems.

A careful theoretical framework for this study is based on the work by Griffith previously cited. The role of the school administrator is conceptually broken down (after Davies) into *the man, the job, and the social setting.* Each of these can in turn be broken down. Another approach, attributed by Griffith to Katz, examines what the administrator does in terms of three skills: *technical, human,* and *conceptual.* These theoretical approaches are carefully related to the design of the study, which will provide an empirical test.

Field Studies

In the spring of 1957 the Graduate School of Education of Harvard University and the neighboring systems of Concord, Lexington, and Newton were awarded a substantial grant by the Fund for the Advancement of Education (Ford Foundation). The overall scheme is described in the following release from the joint board: "We believe the time has come for a thorough analysis of what is being taught in the schools, by whom, and under what circumstances. This involves more than merely analysis; if action is to take place, it means a new pattern of co-operation between universities and school systems. Proposals should lead to actual programs of experiment and demonstration. Relations between the university and school systems must be established which are analogous to those which have long been in effect between medical schools and teaching

and research hospitals". It is proposed that various patterns of change be tried in the cooperating school systems. Already the systems have been experimenting. For example, one school has tried having an outstanding teacher "teach" two to three hundred students at once with lecture, visual aids, etc.; another has a system whereby housewives who were college majors in English correct English themes of high school students; another school has tried Spanish and French records (homework consists in taking home records rather than books!); while still another school has a system of one master teacher associated with half a dozen other teachers, who in turn are associated with apprentice teachers or teaching aides. One system which is growing rapildy adds many new teachers to its staff each year and therefore has an extensive inservice education program. Harvard hopes to study the effect of these changes (1) in the community, (2) in the classroom, and (3) on the selection and placement of personnel. However, the relationship proposed is not that of an external evaluator. Harvard also proposes to cooperate intimately in planning proposed programs and *in carrying them out in the school system.*

The above describes in general the proposed field studies. More specific details require joint planning and agreement, and will undoubtedly evolve to an extent. The overall aim of these field studies is the improvement of instruction, partially at least by redeployment of personnel. It is clear that these field studies are research on the problems administrators face, in contrast with those previously described in leadership and assessment, which are upon administrators themselves.

A SCIENCE SEMINAR FOR ALBERTA HIGH SCHOOL TEACHERS

H. C. Melsness
Faculty of Education
University of Alberta

(A report of an experiment in the in-service education of high school science teachers and in cooperative action by industry and education. This report is presented to describe a kind of action research into the improvement of science education in Alberta high schools.)

This three-day seminar was sponsored by the Imperial Oil Company and was held at Edmonton and Calgary on April 24, 25 and 26, 1957. The twenty-three science teachers who participated in the seminar were selected by the High School Inspectors and came from all parts of Alberta. Also taking part were members of the staff of Imperial Oil Limited, the Department of Education and the Faculty of Education. All expenses were borne by Imperial Oil.

Origin of the Seminar:

The Imperial Oil Company had sponsored and conducted a symposium and seminar for University deans, professors and research leaders at Sarnia in 1955. In conversation with members of the Department and the Faculty of Education, officials of the Company expressed an interest in trying a similar plan for high school science teachers. As a result, a committee representing the Department of Education, the Faculty of Education, Imperial Oil Limited and the science teachers was set up to explore the possibilities of such a seminar and to develop a program.

Purposes:

During the early discussions and the planning of the seminar a number of worthwhile purposes were suggested. Among these were the following :

1. To acquaint high school science teachers with various aspects of one of Alberta's leading industries — the oil industry.

2. To attempt to bring about a closer liaison between industry and education generally.

3. To make teachers more aware of the needs of industry in the education and training of its personnel, and of the opportunities that exist for young people in the oil industry.

4. To provide information to science teachers which would help

to enrich and vitalize the teaching of science in the High school program.

The Program:

Members of the staff of Imperial Oil Company in Edmonton and Calgary, in consultation with the committee which had been set up, spent considerable time and careful thought in arranging the program. Notable in this planning was the attempt to relate papers and discussions as clearly as possible to appropriate parts of the high school sceince curriculum and to other needs of the high school such as vocational guidance. The Company made all arrangements for transportation and living accommodation of the participants.

The first two days were spent in Edmonton. On the evening of the second day the group was flown to Calgary and the third day was spent in studying the company's research laboratory facilities there. The final evaluation session was held in Calgary before members of the group returned home.

For the first two days the program was arranged so that the forenoons were devoted to papers delivered by technical personnel of the company followed by group discussion. The afternoons were used to tour and study some of Imperial Oil Company's facilities in the Edmonton area.

Copies of all addresses as well as much additional material and information were supplied to each participant in loose-leaf binders for later reference.

Following is a condensed outline of the program:

Wednesday, April 24

Morning: Papers on *Oil Exploration and Production*, followed by discussions:
- (a) Exploring for Oil
- (b) Drilling and Its Attendant Problems
- (c) Well Completion and Production
- (d) Gas Gathering and Processing

Afternoon: Tour of Gas Conservation Plant at Devon, and of the Leduc Oil Field.

Evening: Reception and dinner at the Macdonald Hotel at which President Andrew Stewart of the University of Alberta addressed the group.

Thursday, April 25

Morning: Papers on *Manufacturing Processes* followed by discussions:
- (a) Refinery Operations
- (b) Product Quality and Laboratory Techniques
- (c) Product Research

Afternoon: Tour of refinery, laboratory and lubrication plant.

Evening: Flight to Calgary.

Friday, April 26

Forenoon: Visit to the research laboratory where the following were discussed:

(a) Research and Technical Service
(b) Chemistry and Petroleum Productions
(c) Exploration Geophysics
(d) Muskeg in Northern Canada
(e) Corrosion in Oil Production
(f) Corrosion Demonstrations

Afternoon: Conference and Panel Discussion—An evaluation of the seminar.

Evening: Return Flight to Edmonton.

Outcomes

The final session on Friday afternoon attempted to evaluate the outcomes of the seminar to the participating teachers. It was generally agreed that the following were some of the outcomes:

1. It was instructional to teachers in that it provided up-to-date information not found in textbooks, and broadened the teachers' background and understanding of many aspects of science.
2. It was a challenge to science teachers to keep up-to-date in their professional knowledge and methods.
3. It demonstrated the value of cooperation between industry and education and of how industry can be of assistance to teachers.
4. It pointed up ways in which teachers, through a better understanding of the personnel needs of industry, could give better guidance to students.
5. It was emphasized that students need a good understanding of basis science principles, and that much of the material presented and discussed would serve as illustrations of the application of science.

Suggestions for Further Action:

1. Consideration was given to means whereby the results of the seminar might be passed on to other science teachers. It was agreed that this could be done through group meetings, institutes, articles in the A.T.A. magazine, etc.
2. It was suggested that a survey be made at a later date to determine the extent to which participation in the seminar had influenced the teaching of science by members of the group.
3. It was recommended that further seminars of this kind be planned in the future.
4. It was suggested that further cooperation by industry with education might include summer employment of science teachers and students to familiarize them even further with the application of science to industry.

A SURVEY OF THE PROBLEMS OF ADOLESCENT HIGH SCHOOL GIRLS FOURTEEN TO EIGHTEEN YEARS OF AGE

Ada Lent
Victoria Composite High School
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The Nature and Extent of the Problem

The period of adolescence is not the happy, carefree age it is frequently supposed to be. On the contrary, it is often characterized by problems and responsibilities centering about home life, school experiences, and social relationships. There is a constant struggle for security, acceptance and status, and many adolescents find it extremely difficult to cope with obstacles which must be overcome to satisfy these needs. While behavior arising as a result of adolescent needs is definitely conditioned by the home[1], life at school and relationships with teachers and peers also have a profound psychological impact on the youth's way of life.[2]

Authorities[3] state that by the time the child reaches school age, serious maladjustments seldom result unless he is so predisposed. They say, however, that while school is seldom the direct or chief cause of difficulty, it may be a precipitating factor. Because of the strain in making new adjustments, the first signs of trouble may appear on first entering school, or upon entrance to high school.

The incidence of maladjustment among school children has been the subject of extensive investigation. The findings of three recent English surveys[4] suggest that about one per cent of school children need treatment in any one year. The White House Conference on Child Heath and Protection[5] revealed that one of every eight children is poorly adjusted, and that in a classroom of thirty, there are at least three children with severe emotional problems. Other studies[6] estimate that one out of twenty of our present school population is destined to spend some time in a mental hospital, and that one out of thirteen is in need of special help and consideration.

Purpose of the Survey and the Sample Used

This survey of the problems of adolescent high school girls was carried out in connection with the guidance and counseling program of a large composite senior high school in the city of Edmonton. The main purpose of the survey was to determine the number, type, and

1August B. Hollinshead, **Elmtown's Youth**, p. 441.
2Arthur T. Jersild, **In Search of Self**, p. 7.
3Ministry of Education, **The Report of the Committee on Maladjusted Children**, p. 32.

distribution of problems of each age group from fourteen to eighteen years of age. A further purpose was to evaluate the survey instrument as a group screening device.

The sample used in the survey consisted of 425 girls, selected on the basis of age and availability. Of these girls, 100 were fourteen years of age, and were obtained from junior high school; 100 were fifteen, 100 were sixteen, 89 were seventeen, and 36 were eighteen years of age. It was expected that this group would provide a sufficiently representative sample to permit an insight into the problems typical of girls of these ages.

Adolescent Problems in Terms of Behavior

For the purpose of the survey, the psychological interpretation of behavior from the personality theories of Lecky[7], Allport[8], Rotter[9], and Bell[10], was used as the basis for the definition of a problem. Accordingly the individual's behavior is held to reflect the relationship between the demands of the self and the demands of the situation, and is an attempt to adapt to these internal and external demands. A problem is that situation which is significant to the individual, but for which a satisfying solution is difficult or impossible to achieve. These situations are psychological barriers which have their origin in earlier childhood, in the immediate past, or in present experiences. It is assumed that emotional disturbance or conflict, arising as a result of these blocks, is expressed or revealed in the kind and quality of behavior, and that the conflict is subject to detection and interpretation.

The Survey Instrument

Projective techniques, represented by such methods as interpretation of ink-blots, pictures, role-playing, word-association, and sentence completion, are considered to be effective means of gaining insight into underlying causes of behavior. Rotter's Incomplete Sentences Blank, High School Form, (ISB), selected for use in the survey, is essential by a projective technique, utilizing free association of ideas. In response to sentence beginnings, the subject inadvertently reveals his true self, since there is no way in which he can anticipate the significance of the answers. In this, as in other projective devices, it is assumed that the subject reflects his own wishes, desires, fears, and attitudes in the sentences he completes.

4Ibid., p. 171.
5White House Conference on Child Health and Protection, p. 101.
6Harold W. Bernard, Mental Hygiene for Classroom Teachers, p. 7.
7Prescott Lecky, Self-Consistency: A Theory of Personality, 1945.
8Gordon W. Allport, Personality: A Psychological Interpretation, 1937.
9Julian B. Rotter, Social Learning and Clinical Psychology, 1954.
10J. E. Bell, Protective Techniques: A Dynamic Approach to the Study of Personality, 1948.

The ISB[11] consists of forty stems printed on both sides of a single sheet, with suitable spaces for completions. Administration to a large group is relatively easy, requires no special training, and results in no apparent loss in validity. Individual administration is possible, and once started, the subject can complete the test without supervision. In this survey, the ISB blanks were administered by classroom teachers. The time required was about forty minutes, and for convenience in administration, classes composed entirely of girls were used wherever possible. A few of the blanks were individually administered.

Problem Recognition, Interpretation, and Classification

As a basis for problem recognition, Rotter's explanation of conflict and the nature of conflictive behavior was relied upon. Problems found in the completions were classified in eleven categories. Ten of these, developed from the Mooney Problem Check Lists[12], were taken from a pilot survey. One futher category was added to cover problems indicative of escape tendency.

To use the classification scheme, it was necessary to recognize the typical responses indicative of conflict, and to interpret their meaning in order to determine the category to which the response should be referred. For this purpose, typical completions were selected as sample categorizations from completions in a pilot survey, and from those supplied in the Rotter manual.[13] The task of categorization then became the matching of conflict responses with those assigned as typical of each category.

Reliability and Validity

Since the use made of the ISB in this survey was not that for which it was designed, the reliability of the classification had to be established. Reliability depended on: (1) objectivity and consistency in interpretation of completions, (2) accuracy in categorization of problems, and (3) stability of the subjects' responses. These reliabilities were secured by obtaining inter-scorer agreement of three examiners, intra-scorer agreement of the writer only, and test-retest of eighty subjects not included in the survey.

The inter-scorer reliability, based on total problems categorized from completions on fifty blanks by one examiner, and recategorized from the same fifty blanks by the writer, was 62.3 per cent. Intra-scorer reliability, based on total problems from classification and reclassification of another set of fifty blanks, was 97.0 per cent. Reliability of the subjects' responses, scored by the writer, was 90.0 per cent. Validity was based on rapport between the subjects

11Julian B. Rotter, **Incomplete Sentences Blank, High School Form**, 1950.
12Ross L. Mooney, and Leonard V. Gordon, **The Mooney Problem Check Lists**, 1950.

and the teachers who administered the blanks, and on known problems of many of the subjects.

Survey Findings

The ISB completions showed that the bulk of problems was experienced in four areas: Personal-Psychological, Study-Learning, Social-Psychological and Home-Family Relationships. The remaining categories showed decreasing numbers of problems, and definite age trends were apparent. Comparison of the percentage of problenms found in each category for the total group of 425 girls is shown in Table I.

TABLE I

PERCENTAGE OF PROBLEMS IN EACH CATEGORY: TOTAL GROUP

Category	Per Cent
Personal-Psychological	24.6
Study-Learning	21.6
Social-Psychological	12.8
Home-Family	10.3
Health	7.6
Heterosexual Relationships	6.9
The Future	5.7
Economics	4.2
Social Recreational	3.6
Morals and Religion	2.2
Escapist—Unrealistic—Fantasy Tendency	1.3

Nearly one-quarter, or 24.6 per cent, of the problems for the entire group were Personal-Psychological; over one-fifth, or 21.6 per cent were Study-Learning; over one-eighth, or 12.8 per cent were Social-Psychological, and over one-tenth, or 10.3 per cent were Home-Family problems. This table demonstrates the striking difference in size between the first two categories, Personal-Psychological and Study-Learning, and the other nine which made up the complete set of eleven categories used for problem categorization.

Table II presents the percentage of problems in each category for the total group, and for each age group. A distinctive feature of this table is a definite pattern in the arrangement of categories for all age groups, with the most important problem areas in Group I, and those of lesser imporance in Group II and Group III. A second disinctive feature of the table is the definite age trend in the problem distribution of the first two categories of Group 1. The Personal-Psychological category indicates a sharp upward trend in

[13]Julian B. Rotter, and Janet E. Raferty, **Manual, The Rotter Incomplete Sentences Blank, College Form, 1950.**

personal problems, from 19.6 per cent at fourteen years, to 35.2 per cent at eighteen years of age, while during the same period the Study-Learning category shows a decline in school problems, from 25.8 percent at the fourteen year level, to 16.6 per cent at eighteen years of age.

TABLE II

GROUPING OF CATEGORIES OF PROBLEMS IN ORDER OF IMPORTANCE

Category Groups	Categories	% of Total Group	Percentage of Problems in Each Category				
			14 Years	15 Years	16 Years	17 Years	18 Years
I	Personal-Psychological	24.6	19.6	23.1	23.8	26.9	35.2
	Study-Learning	21.6	25.8	26.5	19.5	17.3	16.6
	Social-Psychological	12.8	15.1	11.5	11.8	11.8	15.5
	Home-Family Relationships	10.3	11.2	10.8	9.9	11.0	7.9
II	Health	7.6	9.0	8.8	5.9	7.9	5.1
	Heterosexual-Relationships	6.9	3.0	3.5	9.4	7.3	6.5
	The Future	5.7	6.4	4.5	7.0	4.4	6.2
	Economic	4.2	4.0	5.3	4.2	4.3	2.5
III	Social-Recreational	3.6	4.0	3.7	4.1	3.2	1.3
	Morals and Religion	2.2	.9	1.8	3.1	3.1	1.7
	Escapist-Unrealistic-Fantasy Tendency	1.3	.9	.6	1.0	2.3	1.6
N=425		100.8	99.9	99.9	99.7	99.5	100.1

TABLE III

PERCENTAGE OF PROBLEMS IN THE PERSONAL-PSYCHOLOGICAL CATEGORY ON AN AGE BASIS

Age	Per Cent
Fourteen	19.6
Fifteen	23.1
Sixteen	23.8
Seventeen	26.9
Eighteen	35.2

Of the eleven categories employed in the survey, the Personal-Psychological is the most distinctive. Not only does it contain the largest percentage of problems, but it stands first in importance for the three older groups, and second in importance for the two younger groups. Table III presents a comparison of the percentage

of personal problems for the five age groups. The marked increase at eighteen years of age may be the result of the small sample. However, the increase in the problems in this category during the previous years give no reason to expect a change in direction.

The area of personal adjustment, in which difficulties directly affecting mental and emotional health are likely to appear, was planned to include problems expressing self-criticism, feeling of inferiority and of not being wanted, overconcern with the problems of others, withdrawal, regret about the past, or unsatisfactory comparison relating to the past, and fears of a general nature. Problems of this type are not unusual during adolescence, but that they assume a position of such moment, and increase in importance with age is a valuable finding, and points to the fact that advance toward maturity and increasing freedom from problems of personal adjustment do not go together.

Problems assigned to this category were found in completions such as, "I . . . am very lonely sometimes." "People . . . misunderstand me." "I . . . have few friends." "wish I were happy all the time;" "am moody;" "feel restless;" "am easily hurt;" "am depressed." "I feel . . . sorry for unfortunate people;" "not wanted;" "inferior." "I wish I were dead; had never been born." My greatest fear . . . is war; fire; wind; death."

It might be expected that intellectual handicap would be related to personal and social adjustment. However, Conrad et al[14] found that intelligence offers little or no prediction of the quailty of adjustment. In a study of self- concepts of boys and girls in junior high schools, Taschuk[15] found no significant relationship between intelligence and self-acceptance.

If this method of obtaining problems is assumed to be valid and reliable, the size of the personal problems category should be of concern to those dealing with adolescents in the high school, since preoccupation with these problems directly affects satisfactory school achievement. Its importance is again emphasized when the close relationship of personal adjustment problems to poor mental health is realized. Attention was drawn earlier to the incidence of maladjustment among school children. The findings of this survey appear to support these figures.

The distribution of Study-Learning problems is shown in Table IV. The distinct and fairly rapid decrease in percentage of problems from 25.8 per cent at fourteen years to 16.6 per cent at eighteen years is a satisfying finding, and is in line with the expected growth in the student's ability to choose courses more nearly suited to

[14]National Society for the Study of Education, pp. 165-181.
[15]W. A. Taschuk, The Alberta Journal of Educational Research, p. 102.

TABLE IV

PERCENTAGE OF PROBLEMS IN THE STUDY-LEARNING CATEGORY ON AN AGE BASIS

Age	Per Cent
Fourteen	25.8
Fifteen	26.5
Sixteen	19.5
Seventeen	17.3
Eighteen	16.6

capacity and need. However, the percentage of these problems at all ages is still large. The conspicuous place given to them should be of significance to school personnel, and should draw attention to the need for guidance, particularly at fourteen and fifteen years of age. Timely assistance would tend to lessen the incidence of failure in the school. It might help to reduce the number of problems in the Personal-Psychological area, to which generalized failure is referred.

The Social-Psychological category, presented in Table V, included attitudes and feelings toward others as expressed in criticism and dislike of people, their intentions and their actions. These attitudes were found in completions such as, "People . . . are nicest when they want something from you." "What annoys me . . . are snobbish people." "I . . . hate people." This category is closely associated with the Personal-Psychological category, since the person who is critical of others is likely to set a low value on himself[16]. Taschuk[17] found a highly significant relationship between the areas of the social and personal aspects of self.

TABLE V

PERCENTAGE OF PROBLEMS IN THE SOCIAL-PSYCHOLOGICAL CATEGORY ON AN AGE BASIS

Age	Per Cent
Fourteen	15.1
Fifteen	11.5
Sixteen	11.8
Seventeen	11.8
Eighteen	15.5

16Arthur T. Jersild, **In Search of Self**, p. 46.
17W. T. Taschuk, **op. cit.**, p. 102.

Third in importance among eleven problem areas, the Social-Phychological category represents the difficult task of socialization. Since it is closely related to the Personal-Psychological category, the problem distribution might have been expected to follow a similar trend, but this was not found to be so. However, its importance should not be minimized as a problem source, since many of the difficulties and failures experienced may be felt more keenly as personal problems, with resulting increase in the Personal-Psychological category. It is also important to note that there is no decrease in the incidence of problems as the girls grow older.

The Home-Family Relationships category is shown in Table VI. Problems here were found in completions such as, "A mother does not know how you feel:" "sometimes does not understand her child:" "should give equal affection to each child.' "My father is disagreeable;" "never at home;" "does not live at home;" "is dead;" "is mean;" "won't let me choose my friends."

TABLE VI

PERCENTAGE OF PROBLEMS IN THE HOME-FAMILY RELATIONSHIPS CATEGORY ON AN AGE BASIS

Age	Per Cent
Fourteen	11.2
Fifteen	10.8
Sixteen	9.9
Seventeen	11.0
Eighteen	7.9

The steady decline from 11.2 per cent at fourteen years, to 7.9 percent at eighteen years of age may be important. The deviation from this general trend at seventeen years may not indicate anything of note, although a study by Ivins et al [18] found that both boys and girls of seventeen year of age exhibited excessive emotional instability. The home is also considered by most authorities to be a potent problem source, but because if its very familiarity the individual is likely to place the blame for home difficulties elsewhere.

The Heterosexual Relationships category, with an over-all increase from 3.0 per cent to 6.5 per cent, is shown in Table VIII.

In view of the emphasis placed upon problems of heterosexual adjustment in the literature dealing with adolescent development, the small size of this category was somewhat unexpected. However, this area is part of the larger area of general socialization, and

[18]William H. Ivins, William H. Fox, and David Segel, **A Study of a Secondary School Program in Light of Characteristics and Needs of Youth**, p. 19.

TABLE VII

PERCENTAGE OF PROBLEMS IN THE HETEROSEXUAL RELATIONS CATEGORY ON AN AGE BASIS

Age	Per Cent
Fourteen	3.0
Fifteen	3.5
Sixteen	9.4
Seventeen	7.3
Eighteen	6.5

problems experienced may have both social and personal repercussions. If this is so, these problems serve to increase the importance of both the Social-Psychological and the Personal-Psychological categories, and do not appear in the category in which they originated. The reader is also reminded that size of category is not a good measure of the intensity of difficulty. Even one problem of a serious nature may hold greater implications for individual adjustment than would many problems with less personal meaning, since pain is always referred to the self.[19]

Because of the small percentage of problems in Group III categories, definite age trends were not clear. These categories were considered to be more value in individual counseling than for the group. This is particularly so in the case of the eleventh category, Escapist-Unrealistic-Fantasy Tendency. Completions indicative of a tendency to escape were found in such expressions as, "My mind . . . wanders too much"; " . . . is full of hopless dreams"; " .. . is always thinking of something else." "I . . . daydream all the time"; ". . . can't concentrate"; ". . . want to get away"; ". . . wish I were far away."

Summary and Conclusions

This survey investigated, by means of the Rotter Incomplete Sentences Blank, High School Form (ISB), the number, type, and distribution of the problems of 425 adolescent high school girls, fourteen to eighteen years of age, who were attending Edmonton high schools. The subjects were selected on the basis of age and availability.

The problems found in the completions were interpreted on the basis of Rotter's explanation of conflict, and were classified by two examiners and the writer in eleven categories. Reliability of the classification scheme was established on the basis of inter-scorer and intra-scoror agreement, and test-retest of eighty subjects not

[19]Gordon W. Allport, **Personality: A Psychological Interpretation**, p. 164.

included in the survey. Validity was judged on the basis of rapport between the subjects and the teachers who administered the ISB, and on known problems of many of the subjects.

The findings revealed important problem areas, and definite age trends in problem distribution. The four most outstanding problem areas were: Personal-Psychological, Study-Learning, Social-Psychological, and Home-Family Relationships. Distinctive age trends in problem distribution were revealed for the first two, and less definite trends for the latter two areas. Over two-thirds, or 69.3 per cent of the problems for the entire group were found in these four categories,

The most prominent category, in both size and distribution, was the Personal-Psychological. It contained the largest percentage of problems for the three older groups, and the second largest for the two younger groups, and showed a rapid rise from fourteen to eighteen years of age. The Study-Learning category showed the opposite trend. The Social-Psychological category was less distinctive and showed no decrease, while the home diminished as a problem source. The Heterosexual Relationships category was not as prominent as might have been expected, though these problems, which are part of the larger task of socialization, may have repercussions in the personal and social areas.

The falling-off with age of frequency of problems in the Study-Learning category is reassuring, though frequency is still substantial. This finding is supported by results of other problem surveys in which the school stands high on the list of problem areas.

The one finding which was both startling and distributing was that revealed in the Personal-Psychological category. This area is the one in which difficulties directly affecting mental health are likely to appear. It has been suggested that the extent of maladjustment among adolescents in high school is more serious than most teachers realize, and the findings of the survey appear to support this view.

The number of problems in any given area is not necessarily an index of their seriousness. One problem expressed by the individual may be of greater moment to him than many problems for another. For this reason, the smaller categories, especially Morals and Religion and Escapist-Unrealistic-Fantasy Tendency, were considered to be important for individual use. These, and the largest category, Personal-Psychological, were considered to be most closely related to mental health.

Much external evidence confirms the accuracy of these findings for the population concerned. There is no reason to doubt their

applicability to similarly environed girls everywhere of ages fourteen to eighteen.

Rotter's Incomplete Sentence Blank seems a practical instrument for revealing both group and individual problems. But it should be supplemented by all available information from the other sources; and its effectiveness is relative to the competence of the user in interpreting the sentence completions.

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THE SELF IN INTERPERSONAL THEORY: THE RELATIONSHIP BETWEEN ATTITUDES REFERRING TO SELF AND SIGNIFICANT OTHERS

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Because personality theory has a direct influence on methods of counselling used in our schools, it is not surprising to find educators interested in personality research. Research support for different theories of personality has been established. One general theory of personality, barely in its infancy, the theory of interpersonal relations, is enjoying increasing application in counselling and clinical practice where research has demonstrated its utility. Research support for its fundamental postulates remain scant. Providing support for one of the premises basic to interpersonal theory was the problem of this study.

The Study

The problem was delimited by examining the definitions of personality, of self and of significant others used by interpersonal theory. It was recognized that most essential to the theory was the hypothesis that one's attitudes referring to self are correlated with one's attitudes referring to others. Testing this hypothesis, and two related hypotheses, was the aim of this study.

Theoretical Setting

Harry Stack Sullivan, whose studies are basic to interpersonal theory, has defined personality as "the relatively enduring pattern of interpersonal situations which characterize a human life."[1] The word 'pattern' refers to the containing manifold of insignificant differences in interpersonal processes. Significant differences may and do occur. When they do, the construct is affected and the result is normally referred to as a personality change. The interpersonal situations are sucessive events in which the self interacts with other persons, particularly with those individual other persons who have had the most significant effect on the development of the self. The self-conceptualization process is based on successive conceptualizations of these significant others. Stated otherwise one's self-concept is a function of one's concepts of the persons most important to him.

In brief, the interpersonal theory of personality hypothesizes a

[1]Harry Stack Sullivan, **Conceptions of Modern Psychiatry**, p. vi.

system of interpersonal processes, the locus of which system is the self. This relationship between the individual and his environment of significant other-figures emerges as the postulation most essential to the general theory. Accordingly, it constitutes the hypothesis in most immediate need of investigation.

Three Hypotheses

The investigation was begun by enunciating one basic hypothesis and two related hypotheses.

Hypothesis One: Grade nine pupils' attitudes of dominance-submissiveness used in describing the self are correlated with their dominance-submissiveness attitudes describing individual other persons.

Hypothesis Two: The correlation between attitudes toward self and attitudes toward peers is not significantly different from the correlation between attitudes toward self and attitudes toward adults.

Hypothesis Three: Grade nine boys and grade nine girls do not differ in the degree to which their self-attitudes are correlated with their attitudes toward others.

Preparation of the Instrument

In order to test the foregoing experimental hypothesis an instrument was required which would fulfill certain conditions: (1) The instrument used for quantifying attitudes toward self must be the same as the one used in quantifying attitudes toward others so that the relationship between the two might be investigated. (2) The instrument must permit statistical comparison. (3) All items of the instrument must lie within the dominance-submissiveness continuum. (4) The instrument must not be too difficult for a sample of grade nine students; the results must be as free as possible from contaminating factors of intelligence and reading ability. (5) It must include an adequate representation of the subject's significant others. (6) It must contain some estimate of the relative significance of each other-figure to the subject. (7) The other-figures must be measured separately. (8) it must be short enough to be administered in the time available—one classroom period. (9) It must contain no feature which might provoke adverse reactions from the subjects, their parents or their teachers. It was decided that an instrument which would contain a set of attitude scales could best meet these conditions.

The Attitude Scale

Of the three most widely used methods of attitude scaling, the Guttman method has failed to impress the critics. One comment

from the literature is typical: " . . . the writers feel that several basic flaws in the method are apparent and that an attitude of suspicion toward the general application of the technique is justified."[2] Referring to the remaining two methods, Thurstone and Likert type scales, McNemar writes, "Both methods have merits, and both have defects which might be overcome by a combination of the two."[3] He suggests that either technique will yield a more reliable scale when it embodies a feature of the other method: a Thurstone scale purified by internal consistency tests and using a forced choice response, or a Likert scale using items selected according to the ratings of competent judges. The instrument developed in this study was of the latter form.

Collecting Items

As many published tests claiming to contain dominance-submissiveness items as could be located were examined. A total of 130 items was collected from these sources which included the Interpersonal Check List, Pinter's Aspects of Personality, Guilford-Martin Factors GAMIN and the Bernreuter Personality Inventory. Each item was changed into a descriptive attitude statement as required by hypothesis one. Some items which lost their meaning when applied to both self and others were discarded. Items showing restricted application, duplicate items and ambiguous items were also discarded.

Editing Items

Six adults, selected because of their contact with and understanding of junior high school children, their familiarity with test construction and their knowledge and standards of English usage, were asked to edit the remaining seventy-two items. Each editor was asked to consider every statement with reference to boys and girls of about fifteen years of age who would use the statements in describing other persons and themselves. Following the recommendations of the editors, eight items were discarded or included in other items, and changes were made in many more.

Logical Validation

This step attempted to determine which of the remaining sixty-four items were most valid, considering that their purpose was to elicit an attitude on dominant or submissive behavior. Twenty

[2]K. E. Clark and P. H. Kriedt, "An Application of Guttman's New Scaling Techniques to an Attitude Questionnaire," **Educational and Psychological Measurement** (1948), p. 221. See also: A. L. Edwards and F. P. Kilpatrick, "A Technique for the Construction of Attitude Scales," **Journal of Applied Psychology** (1948) and P. H. Kriedt and K. E. Clark, "Item Analysis vs. Scale Analysis," **Journal of Applied Psychology** (1949).

[3]Quinn McNemar, "Opinion-Attitude Methodology," **Psychological Bulletin** (1946), p. 308.

adults rated each item as satisfactory, very satisfactory or unsatisfactory according to how well it could be expected to elicit the attitude under consideration. Definitions of dominance and submissiveness were deliberately omitted from the instructions. It was expected that the judges, who in their training and experience had been able to develop a concept of dominant behavior and its opposite, would rate the items accordingly. Their ratings were assigned values of two for very satisfactory, one for satisfactory and zero for unsatisfactory. From their summed ratings twenty-four items were discarded because of low validity, two were discarded because of overlap and six were discarded because of their demands on ability to draw inferences.

Length of the Test

A small sub-study was carried out for the purpose of learning how many scales a subject could be expected to complete in a thirty-five minute classroom period. The test contained twenty-two items picked at random on which the subject rated each of ten self-selected peers, four adults specified by role, one self-selected adult and himself. It was found that after they had mastered the instructions the subjects required approximately two and one-half minutes to complete each scale. From this finding, and from a later discussion with the six grade nine volunteers who participated in the sub-study, it was decided that the final test would contain eight similar scales on which to rate each of four self-selected peers, three self-selected adults and the self. This number allowed ten minutes for instruction, which were to be more complex in the final test, and five extra minutes for the slower respondent.

Internal Consistency

To ensure the uni-dimensionality of the scale the test of internal consistency was applied. For a scale to be internally consistent each item score must show a positive and significant correlation with the full scale score. In early April, 1957, seventy-five pupils, the entire grade nine class at an urban junior high school, responded to an attitude scale which contained the thirty-two items surviving the logical validation phase. The subjects rated self only, the assumption being that if all items fell, or failed to fall, within one continuum when the self was being rated, the same would be true when others were rated. Hence each statement began with the personal pronoun "I". In accordance with the Likert method of attitude scaling, half the items were positive (dominance statements) and half were negative (submissiveness statements) arranged in random sequence. Each item was followed by five response categories, one of which the subject must be select. In this test the subject was

to circle SA, A, U, D or SD, to indicate that he strongly agreed, agreed, was undecided, disagreed or strongly disagreed with the statement in describing himself. The items were scored by assigning values of five, four, three, two and one to the response categories for dominance items; values of the reverse order for submissiveness items. The full scale score was the sum of the item scores.

In the thirty-two item scale. the items vs. full scale correlations ranged from —.01 to .51. Nine dominance items and ten submissiveness items yielded correlations significant at the .01 level of confidence. The number of items to be retained in the final test was fixed at twenty: all those which yielded significant correlations in the first test of internal consistency and one item which was somewhat less consistent (significant at the .05 level) with the thirty-two item full scale.

It was next necessary to learn whether a scale composed of the retained twenty items would be internally consistent. For this purpose the scores of the twenty retained items were correlated with full scale scores obtained by summing the scores of the retained items only. In this second test of internal consistency, correlations ranged from .30 to .54. That all were significant at the .01 level demonstrates the fulfilment of the internal consistency requirement.

Reliability

To compute a coefficient of reliability the results of the early April testing were again used. The full scale scores based on the retained twenty items were correlated with full scale scores on the same items obtained from a retest exactly one week later with forty-three of the original subjects. The coefficient of test-retest reliability (coefficient of stability) thus obtained was .91 $\pm$ .03, indicating that the scale possesses a high degree of reliability.

Significance of 'Others'

In a respondent's repertory of significant others some persons will be very close to him, some will be more distant. To determine the relative degree of significance to the respondent of each other-figure selected the subject was asked to place in rank-order the persons selected according to how important a role each played in his life. Space for this purpose was provided on the instruction page in the final form of the instrument.

Public Relations

Asking a school child to state whether his mother is domineering, his father seldom talks back or his teacher is a weak spineless person, could provoke embarrassing reactions. Mother, father and teacher are definitely significant others in a grade nine student's interperson-

al world and their inclusion as specified roles would enhance this piece of research. However, for the necessary and practical consideration of public relations the following steps were taken: (1) All other persons whom the respondent would rate would be self-selected by the respondent and identified on his paper by whatever symbol he chose: name, nickname, initials or other symbol. (2) All test papers would be anonymously answered; their anonymity would be assured by the examiner, a person in good rapport with the respondents. (3) The test would not be administered in a residential area in which there had been previous public relations difficulties. (4) Permission to use the tests in city schools would be obtained from the administrative offices of the school system.

The Interpersonal Attitude Scale (Form D-S)

In its final form the instrument used for testing the hypotheses stated earlier was referred to as the Interpersonal Attitude Scale (Form D-S) or by the abbreviation, IAS. It contained instructions to the examiner, directions for the subject, a space for the selection and identification of other-figures, and eight test pages. On each of these pages was printed an attitude scale composed of the twenty retained items. Each item was followed by the response categories, SA, A, U, D and CD. The subject was asked to rate his three selected adults, four selected peers and himself on one scale each. All statements began with "this person" excepting those on the last page where they began with "I". The statements read as follows:

1. This person likes to tell others what to do.
2. This person is a "follower" in a group.
3. This person takes on responsibility easily.
4. This person is domineering, likes to control others.
5. This person belittles himself, "runs himself down" before others.
7. This person competes with others.
8. This person seldom talks back.
9. This person is easily led.
10. This person is not afraid to say "No" to others.
11. This person is a weak or spineless person.
12. This person acts shy or timid with others.
13. This person lets others "walk all over him".
14. This person leads in a group without showing fear.
15. This person wants to manage other people.
16. This person appears meek or humble.
17. This person acts with self-confidence.
18. This person obeys others willingly.
19. This person usually gives in to others.
20. This person is often giving advice.

Testing Hypotheses

Administration

The IAS was administered to 101 grade nine pupils of both sexes in two urban junior high schools. Fifty-two respondents identified themselves as boys, forty-four as girls, a distribution which is not significantly different ($p = .50$ approximately) from an equal number of each sex. Five failed to indicate their sex. The age distribution showed a median age of fifteen years, four months, and the age range was from 12-1 to 18-3. Testing was carried out between May 24 and May 28, 1957, by examiners who by this time knew the examinees well.

Analyzing the Data

The respondent's full scale score on the final page of the test, eliciting attitudes toward self, was used as the independent variable. Against it were correlated these dependent variables: (1) the score on the first scale in the test (attitudes referring to most significant peer), (2) the score on the fifth scale in the test (attitude referring to most significant adult), (3) the average of scores on the first four scales in the test (attitudes referring to four significant peers), (4) the average of scores on the fifth, sixth and seventh scales in the test (attitudes referring to three significant adults), and (5) the average of scores on the first seven scales in the test (attitudes referring to all significant other-figures selected by the respondent).

Sex differences were investigated using the same variables listed in the foregoing paragraph. The boy's papers were separated from the girls' papers and correlations were computed within each sex as though they were two separate populations.

Coefficients of correlation were computed by the Pearson product-moment method. Before using this method it is an accepted practice that the trait under consideration be established as a continuum, normally distributed in a given population. The distributions of scores on each of the six variables described above were tested for normalcy with two measures, skewness and kurtosis. It must be noted that the items of the IAS, a Likert type scale, are not previously normalized or scaled as the Thurstone and Guttman methods. Testing the significance of difference between the obtained skewness and normal skewness revealed that four distributions failed to exhibit a significant departure from normalcy. Significant skewness was apparent in the respondent's attitudes referring to all adults, and there was a tendency ($p = .08$) for respondents' self attitudes to be positively skewed. None of the distributions exhibited a significant deviation from normal kurtosis. These data are presented in Table 1. In summary, it may be assumed that among

101 grade nine pupils tested on the IAS, attitudes of dominance-submissiveness toward self and toward others closely approach a normal distribution.

TABLE I

RELIABILITY OF MEASURES OF SKEWNESS AND KURTOSIS IN DISTRIBUTIONS OF DOMINANCE-SUBMISSIVENESS ATTITUDES

Measures	Subjects' Attitudes Referring to:					
	Self	Peer No. 1	Adult No. 1	Avg. All Peers	Avg. All Adults	Avg. All Others
Normal Sk.	0	0	0	0	0	0
Obtained Sk.	+1.78	—0.04	+1.06	+0.43	+2.04	+0.39
SE_{Sk}	1.01	0.96	1.15	0.68	0.79	0.58
Critical Ratio	1.76*	0.04	0.92	0.63	2.58*	0.67
Normal Ku.	.263	.263	.263	.263	.263	.263
Obtained Ku.	.246	.266	.226	.258	.268	.266
SE_{Ku}	.028	.028	.028	.028	.028	.028
Critical Ratio	.61	.11	1.32	.18	.18	.11

*Fiducial limits for df = 100: .05 level = 1.98; .01 level = 2.63

The Hypotheses Discussed

Hypothesis one states that grade nine pupils' attitudes of dominance-submissiveness used in describing the self are correlated with their dominance-submissiveness attitudes used in reference to others. Table 2 indicates positive correlation coefficients between the independent variable and each of the five dependent variables which depart from zero correlation to a degree which could be attributed to chance factors alone in fewer than one per cent of trials. Hypothesis one is therefore supported. The data indicate that, in an incidental sample of 101 grade nine pupils, those who regard themselves as dominant persons tend also to regard others of their interpersonal environment as dominant. Conversely, those who regard themselves as submissive tend to consider others submissive.

Hypothesis two states that the correlation between attitudes to self and attitudes to peers is not significantly different from the correlation between attitudes to self and attitudes to adults. Testing the significance of difference between correlation coefficients requires the use of Fisher's z-transformation. In a sample of 101 subjects a z-difference of .28 is necessary to be significant at the .05 level. Table 2 indicates that the z-difference between All Peers and All Adults variables is .06. That both differences fall far short of obtaining significance supports hypothesis two. The implication is that adolescents tend to associate their self-conceptualizations

with their concepts of several other persons close to them, whether these persons are peers or adults.

Hypothesis three states that boys and girls do not differ in the degree to which their self-attitudes are correlated with their attitudes referring to other persons. Table 3 indicates z-differences between the sexes from .09 (Peer No. 1 variable) to .23 (Adult No. 1 variable). Because of the reduced number in each sample ($N_{boys} = 52$, $N_{girls} = 55$), a z-difference of .41 is required for the obtained difference to be significant at the .05 level. Obtained z-differences fall short of this requirement. The critical ratio of the largest sex difference was calculated at 1.10 indicating that a difference that great could occur in twenty-seven per cent of trials owing to chance

TABLE II

CORRELATIONS BETWEEN ATTITUDES TOWARD SELF AND ATTITUDES TOWARD OTHERS AMONG 101 GRADE NINE PUPILS

y-variable	x-variable	r_{xy}	z-transformation
Attitudes toward:	Attitudes toward:		
1. Self	Peer No. 1	.32[a]	.33[b]
2. Self	Adult No. 1	.31	.32
3. Self	All Peers (averaged)	.33	.34
4. Self	All Adults (averaged)	.38	.40
5. Self	All Other-figures (averaged)	.44	.47

[a]All r's are positive and significant at the .01 level.

[b]A difference between z's of .28 is required for significance at the .05 level.

TABLE III

DIFFERENCES BETWEEN 52 GRADE NINE BOYS AND 44 GRADE NINE GIRLS WITH RESPECT TO ATTITUDES TOWARD SELF AND OTHERS

y-variable	x-variables	r_{xy} Boys	r_{xy} Girls	r-Diff.	z-Diff.*
Attitudes toward:	Attitudes toward:				
1. Self	Peer No. 1	.34	.25	.09	.09
2. Self	Adult No. 1	.37	.16	.21	.23
3. Self	All Peers (averaged)	.39	.29	.09	.10
4. Self	All Adults (averaged)	.56	.45	.11	.15
5. Self	All Other-figures (avgd.)	.48	.29	.19	.22

*A z-difference of .35 is required for significance at the .10 level, or .41 at the .05 level.

operations. Inspection of Table 3 indicates that all differences are in one direction: boys' papers yielded consistently higher correlations than girls'. When the significance of difference in one direction only, or the significance of the superiority of one measure over another, was tested, it was found that chance factors could account for the obtained difference in the direction of boys' correlations in more than thirteen per cent of trials. Notwithstanding the observed sex differences, these findings provide convincing support for hypothesis three.

Conclusion

This study was set within the general problem of finding research support for the clinically validated interpersonal relations theory of personality. A measure of support was accorded to the one premise recognized as most essential to the theory. This was accomplished by enunciating three hypotheses and testing them with an instrument developed for that purpose. Because each of the nypotheses was supported the conclusions drawn from this study are a restatement of these hypotheses:

1. Grade nine pupils' attidues of dominance-submissiveness used in describing the self are positively and significantly correlated with their dominance-submissiveness attitudes describing certain other persons most significant to them.
2. Grade nine pupils associate their self-attitudes with their attitudes referring to peers to the same degree as they associate their self-attitudes with their attitudes referring to adults.
3. Grade nine boys and grade nine girls do not differ significantly in the degree to which their self-attitudes are associated with their attitudes referring to others.

Not only more research but also more theoretical formulation is indicated to solve some of the problems of personality psychology raised by this study. Some of the questions this study begs would read: Could some factor other than chance have accounted for the persistent though non-significant sex difference in the direction of boys' correlations? The greater magnitude of boy's correlations was most evident within the Adult No. 1 variable and the smallest within the Peer No. 1 variable. Could some factor other than chance have accounted for the tendency of self-attitudes to be positively skewed? Most other distributions were not significantly skewed. Is the relationship between attitudes referring to self and to significant others a causal relationship. If so, the direction of causality must be determined. Finally, does an undefined intervening variable account for the correlations? It would be within the scope of interpersonal theory to posit such a variable and define it as personality—

the relatively enduring pattern of interpersonal situations which characterize a human life. Research working within a different orientation might well define the variable otherwise.

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THE STRUCTURE AND MOTIVATION OF AN ADOLESCENT PEER GROUP

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Purpose

During the adolescent years the individual often feels confused about his role in society. Adults are not always consistent in their behavior toward him. He is aware of conflicting childish and adult desires, but finds himself out of place in both child and adult groups. One situation in which the adolescent does feel a sense of orientation is in his peer group.

> . . . Next to the family in childhood, and probably equally with the family during adolescence, the peer group provides satisfactions to the basic urges for security in the warmth of friendship and the sense of adequacy that comes with belonging.[1]

Because of the adolescent's sense of being at home with his contemporaries this investigation sought to obtain further light on this development level by a study of the structure of a typical adolescent peer group, the roles of its members and the factors influencing their behavior.

Related Studies

A review of the literature reveals certain characteristic behavior among members of the adolescent peer group. Reference will be made to acceptance, leadership and friends as focal points.

Acceptance

In a study of seven hundred children selected from grades six, nine and twelve in two central New York schools, Kuhlen and Lee[2] stated that at the twelfth grade level highly accepted adolescent boys initiated games, were active, socially aggressive, extroverted, friendly, enthusiastic, cheerful and popular. The least accepted boys sought attention, were restless and domineering, enjoyed fights and acted older than they were.

As the age of the group increased, the investigators found that boys were more frequently mentioned as liking the opposite sex, enjoying jokes on themselves, being willing to take a chance, and as

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[1] National Society for the Study of Education, **Adolescence**, p| 236.

[2] R. G. Kuhlen and B. J. Lee, "Personality Characteristics and Social Acceptability in Adolescence," **Journal of Educational Psychology**, (September, 1943), pp. 321-340.

being enthusiastic. They suggested that increasing sensitivity to social situations and increasing social activity were implied in these trends. With an increase in age, boys assumed a more dominant role in the adolescent social scene.

The position of rural students vanned to a town school was investigated by Bonney[3]. His study contained two groups of vanned and resident pupils. The first sample was 152 students from grades ten, eleven and twelve in a town of five thousand people, and the second contained ninety-four students from grades seven to twelve in a university demonstration high school. He found that in these instances " . . . bus students are not being accepted by their peers on an equal basis with the town students."[4]

Leaders

In a study of leadership in a group of 485 graduates of a large military school over a five year period, Gowan[5] found that leaders tended to be slightly younger than the mean of their age group. They were significantly higher in ability and achievement, significantly less self-sufficient, more confident and sociable, and more inclined to tall, thin body types.

From the cumulative records of 1189 senior graduates from Central High School in Tulsa, Oklahoma, Reynolds[6] selected 437 leaders and 451 non-leaders for study. He reported that high school leaders excel non-leaders in scholarship and intelligence and rate higher on personality traits.

Friends

In a study of 280 boys and girls representing a cross-section of the junior high schools of Riverside, California, Jenkins[7] stated that the socio-economic status of the parent in the community was an important criterion in the choice of friends which the child made. He also noted that children tended to choose friends of approximately the same age and intelligence.

Using a group of 819 New York children from nine to sixteen years of age, Pintner and his associates[8] found that physical maturity and to some extent mental maturity were far more potent in influencing friendships than were personality traits.

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[3]M. E. Bonney, "A Sociometric Study of the Peer Acceptance of Rural Students in Three Consolidatel High Schools," **Educational Administration and Supervision,** (May, 1951), pp. 234-240.

[4]Ibid., p. 239.

[5]J. C. Gowan, "Relationship between Leadership and Personality Measures," **Journal of Educational Research,** (April, 1955), pp. 623-627.

[6]F. J. Reynolds, "Factors of Leadership Among Seniors of Central High Schools, Tulsa, Oklahoma," **Journal of Educational Research** (January, 1944), pp. 356-361.

[7]G. G. Jenkins, "Factors Involving Children's Friendships," **Journal of Educational Psychology,** (September, 1931), pp. 440-448.

[8]R. Pinter, G. Forlano and H. Freedman, "Personality and Attitudinal Similarities Among Classroom Friends," **Journal of Applied Psychology,** (1937), pp. 48-65.

From this review it would appear that authorities agree fairly well on the behavior that adolescent seek in their group members. There is, however, less agreement on the traits that they value in their leaders and their friends.

Method of Study

The case study method was employed in this investigation, not because of the truths it was expected to verify, but because of the insights it was expected to reveal concerning the adolescent peer group. Since age and sex are important factors in grouping, the boys of the grade eleven class of a small Alberta town were the specific group studied. To permit intensive investigation the area for study was limited to two phases of adolescence, the structure of the peer group and the factors that influence the behavior of its members.

To secure information on the nature of the group, the following sociometric measurements were made: a sociometric test asking the question, "Near whom would you like to sit?" was administered in the months of September and December, 1956, and March, 1957. Another sociometric test asking, "Whom would you like to have home with you for the Christmas holidays?" was given in December and a third test asking, "With whom would you like to attend the movies?" was given in March. In addition the Classroom Social Distance Scale developed by Cunningham was used. Two Guess Who tests were administered as well as the Sims Score Card for Socio-Economic Status and the Sims SCI Occupational Rating Scale.

To secure data of a more personal nature the following tests were used: The SRA Youth Inventory, The Rotter Incomplete Sentences Blank, The Thurstone Temperament Schedule, The Gordon Personal Profile, The Guilford-Zimmerman Temperament Survey, The Kuder Preference Record (Vocational), and the Otis Quick Scoring Test of Mental Maturity, Gamma Test.

In addition, autobiographies, interviews with parents, students and teachers and the school's cumulative record system were utilized.

Data

Group Structure

A choice pattern of the group is illustrated in Figure One. This sociogram is the result of a test administered in March, 1957, and represents a fairly stable arrangement of the group. Arrows with two heads show reciprocated choices; single arrows indicate one-way choices. The two triangles represent girls who entered into the boys' choices on this occasion.

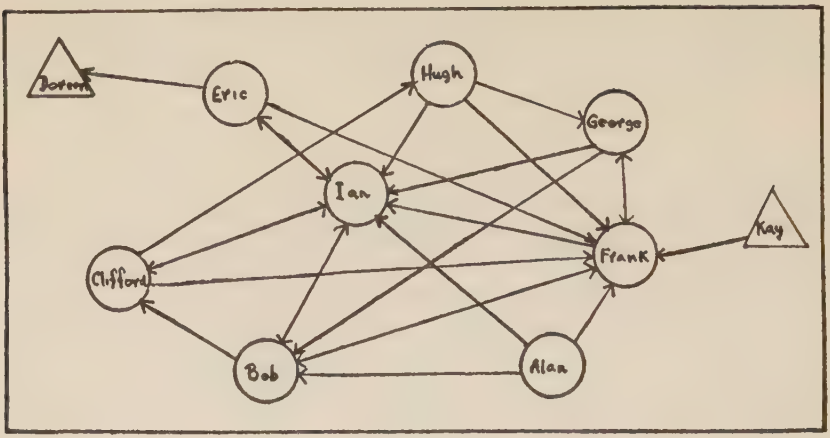

Figure 1—"Near whom would you like to sit?" Grade eleven boys, March, 1957.

From this figure Ian, Frank and Bob appeared to be the most popular boys in the group, positions they held on all the somiometric tests. These boys formed the nucleus of the group, with the other boys attempting to gain acceptance from them. The pattern of choices in this sociogram was similar to the results of the December test, but differed markedly from the one administered in September. This suggested that the early months of school were ones of flux and that a stable relationship was not reached until the boys had had time to become re-acquainted and had re-established their roles in the group.

In Table One the choices received by the boys on the three different types of sociometric tests are given.

TABLE I

CHOICES RECEIVED BY THE NINE GRADE ELEVEN STUDENTS ON THREE DIFFERENT SOCIOMETRIC TESTS

Sociometric Test Criterion	Alan	Bob	Clifford	Dennis	Eric	Frank	George	Hugh	Ian
Seating	2	15	7	1	3	16	4	5	19
Movies	2	4	2	...	1	5	1	0	6
Home Visit	3	2	4	...	0	3	2	1	5
Total of Choices	7	21	13	1	4	24	7	6	30

It would appear that the boys who were desirable as seatmates were also popular as companions at the movies. As far as home visits were concerned, however, the situation was somewhat different. In this instance such factors as the anticipation of the acceptance of the visitor by the family and of the family by the visitor made this choice less satisfactory in revealing inter-personal relationships.

The Classroom Social Distance Scale[9] yields two scores, a group-social-distance score which indicates the degree of acceptance or rejection of an individual by the group, and a self-social-distance score which indicates the degree of acceptance or rejection of the group by an individual. In both instances the lower the score the greater the degree of acceptance.

While it did not yield results consistent with the sociometric tests, this scale did indicate that boys with low group-social- distance scores tended to have high self-social-distance scores and those with high group-social-distance scores had low self-social-distance scores. This suggests that those boys who appear to be well accepted tend to exert greater care in the selection of their friends and that the boys who were insecure in the group seem more ready to accept the group and its individual members.

Individual Studies

A summary of the data collected on the members of the group is given in Table Two. This should prove helpful in understanding the roles assumed by the boys in their activities within the group. The following roles were investigated: best friends, popular persons, leaders, followers and isolates.

Best friends. Interviews held in October, 1956, and March, 1957, revealed that in the group there were three pairs of friends whose relationships remained constant over the period of investigation. These were Bob and Ian, Frank and Bog, and Clifford and Hugh.

Bob and Ian showed somewhat similar patterns on the personality tests, with Bob's scores being generally lower. They come from the same social class, enjoy solitary leisure time activities and have similar adjustment problems. On the whole it appeared that this friendship was based on the similarity of the two boys.

The comparison of Frank and Bob suggests that there are few similarities in temperament and interest between them. Although the sociometric tests revealed that Bob was popular with his classmates, he did not seem to accept this, and appeared to compensate for his feelings of insecurity through Frank's activities and achieve-

[9]Ruth Cunningham and Associates, **Understanding Group Behavior of Goys and Girls,** p. 406.

TABLE II

SUMMARY OF PERSONAL DATA ON NINE GRADE ELEVEN BOYS

Name	Age	Otis I.Q.	Grade X Average Achievement	Expressed Vocational Choice	High Kuder Interest Areas	Personality Traits Based on Guilford-Zimmerman, Gordon Thurstone and Rotter Scales	Problems Revealed by SRA and Rotter Scales and Autobiographies	Sociometric Roles	Sims Socio-Economic Status
Alan	15-6	121	63	Teacher	Mechanical Clerical	Desire to please, gets on well with others, shy, quiet, submissive, insecure, perservering.	Social	Follower Isolate	Medium
Bob	16-4	100	31	R.C.M.P.	Outdoor Artistic	Depressed, anxious, nervous, gets on well with others, somewhat irresponsible.	Home, self, school, social, future.	Popular person, Active follower	High
Clifford	17-10	100	44	Farmer	Computational Persuasive	Active, care-free, impulsive, does not like reflective thinking.	School	Active follower	Medium-high
Dennis	17-2	120	36	R.C.A.F.		Active, optimistic, confident, independent.	Home, school, social.	Follower	Medium
Eric	61-3	111	46	R.C.A.F.	Mechanical Persuasive	Perservering, quiet, thoughtful, likes company of others, self-centered, critical.	Social school.	Follower Isolate	Highest

Frank	16-8	123	52	Engineer	Mechanical Computational Scientific	Impulsive, desire to dominate, cheerful, optimistic, somewhat irresponsible, extroverted.	Home, school, self	Leader Popular person	High
George	16-3	102	47	Engineer	Mechanical Computational	Hypertensive, impulsive, pessimistic, critical of self.	Self, school, future, social.	Follower	High
Hugh	16-1	110	56	Undecided	Mechanical Computational Musical	Inactive, quiet, likes reflective thinking, critical of others, perservering.	Social future.	Follower Isolate	
Ian	16-10	96	38	Geologist	Artistic	Active, enjoys planning activities, submissive, critical of others.	Home, self, social, future.	Popular person Active follower	Medium Low

ments. In this relationship, Frank, an extrovert, is assured of the audience he needs and can bask in the admiration of his friend. This friendship might be termed a hero-and-worshipper relationship.

Table Two indicates that there are few traits common to the boys making up the last pair of friends studied, Hugh and Clifford. The basis of association in this case seemed to be their membership in a minority group of vanned students since both boys lived on farms near town and rode the same van to school. As Bonney[10] reported earlier, such boys experience some difficulty in establishing social relations with the rest of the group and might have become friends as a defence against possible rejection.

Popular persons. By sociometric measurement, Ian, Frank, Bob and Clifford were the most frequently chosen boys. An examination of Table Two suggests that factors other than personality entered into the popularity of the members of the group. Ian and Bob might have gained some measure of popularity through their close association with Frank, the recognized leader of the group. Clifford, the oldest boy, planned to leave school in the spring and the others may have identified themselves with him in this choice. Intelligence did not seem to play too great a part in determining popularity since Frank had an I.Q. of 123, Bob and Clifford had I.Q.'s of 100 and Ian's I.Q. was 96. The achievement of the four most popular boys conformed to the average achievement of the group standards of achievement.

Leaders. In this group Frank was the only widely accepted leader. He was active, care-free, optimistic, popular and cheerful. He liked to be with people and felt that he got on well with them. Frank had the highest mental ability rating of the boys with an I.Q. of 123 and was slightly above average in achievement. He was slightly older than the average age of the group.

Followers. The followers in the group tended to be less active, less stable emotionally. more restrained and submissive than the leader, as far as the personality tests could determine.

Isolates. On the sociometric tests there were four instances where individuals received no choices. In the case of Eric, his critical attitude toward the groups' activities may have been the cause. Hugh was isolated on two tests because he was not available for participation in the group due to a period of hospitalization and the pressure of school work when he returned to class. Alan was not chosen on the last sociometric test asking for seatmates because by reason of the cycling of courses in the previous year, much of his program was taken with the grade ten group. Signific-

[10]M. E. Bonney, **Loc. cit.**

antly, perhaps, Hugh and Alan were the youngest members of the group.

Factors Influencing the Behavior of Adolescents

Within the group

Examination of the sociometric test scores suggest that the individuals were motivated by the desire to gain acceptance in the group. This appeared to be indicated by the pattern of choices of the members, who centered their attention on Bob, Frank and Ian in their selection of seatmates. To be accepted it was also necessary to conform to the group's standards without being unduly critical of its activities. The case of Hugh, who became an isolate apparently through his two months in hospital, points up the fact that for acceptance in the group an individual must be eager and available for participation in its activities. Sharing the interests of the group was also a factor influencing acceptance. This is illustrated by the case of Alan. His program placed him in frequent contact with the grade ten class where he developed friendships and entered many activities. As a result, his classmates in grade eleven did not choose him on the last sociometric test. Alan, Hugh and George, who were not well received by the group, were also its three youngest members.

The role of the individual appeared to have some influence on his behavior. According to paragraphs written by the members, they expected their leader to be cheerful, a good sport, easy-going, sociable and active. These expectations were realized in the behavior of Frank, the only widely accepted leader. From the results of the personality tests, the followers were likely to be less active and more restrained and submissive than the leaders. The more active followers were expected to assume the lead in some activities as Clifford did in the field of athletics.

The boys in this group were just beginning to enjoy activities in the larger adolescent community of both sexes commonly called the crowd. The boys expressed a desire to learn how to dance and how to conduct themselves properly in the crowd. This suggests the increasing importance of social activities and its pressure on the members of the group.

The fact that certain students came to school by van seemed to affect their behavior. These boys were not usually available for activities with the group after school hours and as a result they were not readily taken into the social groups of the school. These students therefore tended to form close associations among themselves, as in the case of Hugh and Clifford in this study.

Outside the group

In their autobiographies and on the Rotter Incomplete Sentences Blank most of the boys indicated satisfaction with their home life. One exception to this was Dennis, who implied that he had some difficulty getting along with his family. His independent and aggressive attitude, particularly noticeable at school, might have been the result of this situation. Bob and Ian suggested that undue emphasis had been placed on academic achievement by their mothers. Their ability was such that these expectations could not be met. This might be the cause of the feelings of insecurity suggested by the personality tests. It would appear that the home exerted a major influence on the behavior of the adolescent.

Another pressure effective upon the attitudes and behavior of the individual seemed to be the school. Alan did not achieve as high a standing in his courses as he desired and this lead to a fear of failure in school. This fear appeared to be transferred to other situations for on the Rotter, Alan commented, "My greatest worry is to try something and fail." Such an attitude might contribute to Alan's retiring, submissive nature.

The outstanding examples of the influence of the home and the school were the cases of Bob and Ian. Their failure to realize, in school, the expectations of their homes seems a fundamental cause of their difficulties in other areas.

Of a positive nature, the boys felt that the teachers influenced their behavior through the examples they gave and through the guidance they provided, particularly in the vocational field.

Conclusions

To permit an intensive case study approach extending over a seven month period, this investigation was limited to two phases of adolescence, the structure of the peer group and the factors influencing the behavior of its members. The group investigated was made up of the boys of the grade eleven class of a small Alberta town.

Group structure

1. The structure of the group appeared to undergo some changes during the early months of school with an increase in stability as time passed. Because of the vacation period which allowed little interaction between members, the value of the sociometric test at the beginning of the school year is rather doubtful.

2. The members seemed to choose companions for the movies on the same basis as they chose seatmates, since the sociometric tests using these two criteria yielded similar results.

3. Since factors other than inter-personal relations entered the responses to the question, "Whom would you like to have home with you to spend the Christmas holidays?" this test did not prove satisfactory in determining the structure of the group.

4. The Classroom Social Distance Scale suggested that boys most accepted by their peers tended to be careful in the selection of their frieinds. Those who were insecure tended to value the group more highly.

Roles

1. The results of this study suggested that the members of the group were not of equal status. The rank of the individual appeared to be determined by his role in the group structure.

2. Best friend relationships may be formed on several bases. The friendship between Bob and Ian appeared to have been founded on a similarity of personality traits and interests. Compensation and admiration seemed to be the basis of the friendship between Bob and Frank. Hugh and Clifford were members of a minority group at school, the vanned students.

3. The reason for the popularity of some of the members of the group were somewhat obscure. Frank, the leader, may have been chosen on the strength of his positive personality traits. Bob and Ian might be popular because of their close association with Frank. Clifford seemed to be rated highly by the boys through their identification with him in his decision to leave school. Intelligence did not appear to play a great part in popularity, but all the highly chosen boys appeared to work close to the average level of achievement of the group.

4. The only widely accepted leader of the group, Frank, was active, care-free, optimistic and cheerful. He liked to be with people, was popular and tended to dominate his associates. Frank had the highest mental ability rating of the boys with an I.Q. of 123, and was slightly above average in achievement. He was older than the average member of the group. In general these findings are in agreement with the earlier studies of leadership by Gowan[11] and Reynolds.[12]

5. According to the tests used, followers tended to be less active, less stable emotionally, more restrained and submissive than the leaders. Active followers, such as Ian, Bob and Clifford were expected to take the lead in some activities.

6. The reasons for isolation by the group appeared to be a lack of conformity to group standards and undue criticism of the group,

11J. C. Gowen, **Loc. cit.**
12F. J. Reynolds, **Loc. cit.**

non-participation in its activities and a lack of common interests with the members. Two of the isolates, Hugh and Alan, were the youngest members of the group and so must have seemed immature to their classmates.

Factors influencing behavior

Within the group

1. One of the important factors influencing the behavior of the individual seemed to be the desire to gain acceptance in the group. To do this it appeared that a boy must gain recognition from one of the key members, share similar interests, be available and eager for participation in group activities, conform to group standards, and be near the average age of the members.

2. The role assumed by the individual in the group also had an effect on his behavior, since the members associated certain traits with the positions of leader, follower, popular person and friend.

3. The increasing importance of social activities seemed to exert pressure on the members of the group. They found it necessary to get along, not with the boys, but with the girls who increasingly entered into their activities.

4. The students who came to school by van were not readily taken into the social groups of the school and tended to form close associations among themselves.

Outside the group.

1. Outside the group the home seemed to exert considerable pressure on the individual. The hostility of Dennis and the insecurity of Bob and Ian appeared to be directly related to home conditions.

2. The school also seemed to affect the behavior of the individual. The transfer of fear of failure in school subjects to other situations seemed evident in Alan. In the cases of Bob and Ian, the school situation seemed to contribute to their adjustment problems. The teachers influenced the boys by their example and through guidance, particularly in the vocational field.

Future Studies

There are many areas related to this study in which research would increase the knowledge of the structure and motivation of the adolescent peer group. An investigation of rural and urban schools would broaden the scope of the study. To discover the developmental nature of the group structure, the boys in grades nine, ten and twelve would have to be involved. The problems of

the vanned student and his interaction with the group might also be worthy of investigation.

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BOOK REVIEW

THE ENGLISH LANGUAGE ARTS IN THE SECONDARY SCHOOL

By The Commission on the English Curriculum of the National Council of Teachers of English. New York, Appleton-Century-Crofts, 1956. pp. 471. $4.00.

This is an authoritative volume. The third in the series prepared by the Commission on the English Curriculum of the National Council of Teachers of English, it is the result of a decade of work by recognized leaders among the teachers of English in the high schools and colleges of the United States and embodies the latest findings of educational research in its field.

Like previous publications of the Council it gives life to its theories by supplying numerous illustrations of procedures used by classroom teachers in the junior and senior high schools throughout the country. Although the examples come from outstanding teachers having access to resources beyond those available to most Alberta teachers, an alert reader will be stimulated to make adaptations to his own circumstances. Some of the chapters, of course, are bound so closely to the American scene that they have little to offer us in Canada, but a good two-thirds of the book is as useful north of the international boundary as south of it.

Chapter 4, BUILDING INSTRUCTIONAL UNITS, will be helpful to teachers of Literature 10 and Literature 20 who are looking for detailed suggestions on how a unit may be handled; forty-two pages of the chapter are devoted to the discussion of one illustrative unit. For those familiar with the Alberta program, Chapter 5, MEETING YOUTH'S NEEDS THROUGH LITERATURE, will probably be found less useful than DEVELOPING COMPETENCE IN READING, which sets forth the views of informed persons on an issue currently engaging our attention. The section on vocabulary building in this chapter is excellent; anyone who reads it will never again use workbooks containing prepared lists of words to be learned at the rate of twenty per week. The chapter on DEVELOPING COMPETENCE IN LISTENING provides an emphasis that is often neglected. The authors assert, "Training in how to listen will determine, in no small measure, how well young people differentiate truths from half-truths, facts from opinions, sensations from emotions, propaganda from education."

MEETING YOUTH'S NEEDS THROUGH WRITING has a number of useful suggestions and faces the central problem in a practical way.

> "How much should students write? No one knows the answer to this question, but there is a universal feeling that they should write more than they do. Some teachers plan a substantial piece of writing every fortnight. Some manage brief bits of summary or personal reaction every day. Others hope for some carefully formulated report or narrative every week.
>
> "With large classes, and many of them, teachers have become thoroughly discouraged. Committees like the one in California are seeking reduced loads for English teachers. The outlook is not promising. With the shortage of teachers and mounting enrollments such an approach to the problem looks all but futile. Moreover, research has been unable to prove that meticulous correction of papers pays dividends. More research comparing different methods of securing results in writing is urgently needed.
>
> "In the meantime, certain courses are open to the teachers. One is to do more stimulating and more building up of ideas before students write so as to make less correcting necessary after they have written. A second is to devise all possible methods of self-help for students to use in the final editing of their own papers."

Specific suggestions are given to help the teachers pursue both of these courses.

The pages on GRAMMAR, USAGE AND SPELLING will comfort the teachers who have kept up to date with their professional reading but will distress those who still revere the memory of THE ONTARIO HIGH SCHOOL GRAMMAR, which passed away in this province in June, 1938. Readers are reminded that "Mere definition or identification is of minor use in the teaching of grammar" . . . "The real evidence of a student's grasp of grammatical concepts lies in his ability (1) to write good sentences, (2) to manipulate parts of sentences easily, and (3) to improve sentences which need improvement." Also of interest to teachers of the Alberta senior high school language courses is the view expressed about handbooks. "There will be frequent needs both in school and in adult life to consult reliable sources of information on current usage. It is, therefore, important that the teacher develop in every student an attitude favorable to consulting such handbooks."

This book is a *must* for the English specialist.

MORRISON WATTS
Director of Curriculum
Department of Education

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Editorial

Action research is often hailed as a solvent of the time lag between the completion of formal research and its application in practice. This time lag, according Dr. Clarke's article in this issue, tends to be considerable. This may be because of delays in publication, difficulties of interpretation of highly condensed and perhaps technically statistical presentations, and the relative disinterest of educators. Action research, while suffering sometimes from the absence of rigidly scientific operational techniques, is done on the spot, and is done by the staff or its agent. It results are immediately available, at least to the staff, its findings may be taken promptly into use, or further experimentation may be launched with improvements suggested by the first study. Mr. McGrath reports in subsequent pages a piece of action research done in Peace River on remedial reading in the intermediate grades.

Occasionally somewhat esoteric statistical devices must be employed to lay bare similarities or differences between variables under review. One such device is known as covariance, a special form of the correlation technique, and used to reduce the data from experiments involving two or more variables measured in several groups. This device is seen at once to be useful in the study reported by Dr. Dunlop and associates. The findings are certain to be of both interest and concern to everyone having to do with the use of school vans for transporting young children. The findings, though clear-cut, have been interpreted with admirable caution.

The Andrews study compares, as to subject matter characteristics (SMC), two types of teachers. They are first, those trained in teacher training colleges, and second, those trained for the most part in liberal arts faculties. The assumption is that the attitude or orientation toward the teaching profession, towards their work, might be different. This assumption is formulated in thirteen hypothesis to be either confirmed or disproven. The conclusions have many administrative implications. Whether these differences exist to any degree in Canadian schools is yet to be determined.

Dr. Byrne proposes six criteria for the evaluation of provincial leadership in the field of public education. Though the criteria have been drawn largely from the literature on leadership in the United States they have been shown in earlier papers of Dr. Byrne to be equally valid in Canadian practice. Despite differences in application, and differences in terminology, the structural principles of school administration are common to the two countries. As an exercise in the application of these criteria, Dr. Byrne relates them to educational leadership in Alberta.

THE INFLUENCE OF THE TIME SPENT IN SCHOOL BUSSES UPON ACHIEVEMENT AND ATTENDANCE OF PUPILS IN ALBERTA CONSOLIDATED SCHOOLS

G. M. Dunlop, R. J. C. Harper and S. Hunka

This investigation was sponsored and financed by the Alberta Advisory Committee on Educational Research and the school boards of the divisions concerned. It could not have been completed without the support and cooperation of school board members, superintendents, principals and teachers. Acknowledgment of this support is expressed, in token form, by listing the superintendents, who were, in fact, prime movers in the project, and the divisions with which they are associated.

Mr. G. F. Hollinshead, B.Sc., B.Ed.	Calgary School Division No. 41
Mr. M. Holman, B.Ed.	Wheatland School Division No. 40
Mr. E. H. Bliss, B.A., B.Ed.	Three Hills School Division No. 60
Mr. X. P. Crispo, B.A., M.A.	Olds School Division No. 31

The Problem

For many years Alberta has attempted to achieve a greater degree of equality of educational opportunity through large scale centralization of schools. As a consequence the traditional one room rural school has tended to disappear gradually, to be replaced by new well equipped and adequately staffed centrally located schools to which many of the pupils are transported by school busses or vans. During the school year of 1955-56 there were approximately 62,864 children transported a distance of 102,790 miles daily to centralized schools on 2,021 vehicles either owned by the school divisions or under contract to them.[1]

Although centralization of schools results in many advantages to the pupils, there are certain hardships which may arise from the situation. One handicap is the fact that many children must spend long periods daily in school busses or vans being conveyed to and from their schools. Lambert[2] found that pupils who were transport-

[1] Fifty-first Annual Report, Department of Education, Province of Alberta, Queen's Printer, 1957, p. 167.

[2] A. C. Lambert, "Length of School Day for Transported Pupils," **American School Board Journal** 99, (September, 1939), pp. 45-46.

ed to school in authorized vehicles experienced an appreciabale lengthening of the school day.

Bonney[3] discovered that vanned students were not accepted by their peers on an equal basis with town students, due, in part, to differences in socioeconomic and cultural backgrounds. Munro[4] found a similar lack of acceptance of vanned high school pupils who, in turn, tended to develop into an 'out group' clique.

Lee[5] has provided evidence suggesting that children transported to classes in a school vehicle show a greater degree of maladjustment than children who do not require transportation. He reports that boys show more disturbance of adjustment than girls. In explanation he advances the hypothesis that the observed maladjustment may spring from deprivation of maternal care which falls with greater severity upon the vanned children due to the extension of their daily period of absence from the home.

Little research has been published on the influence of time spent in being transported to and from school on academic achievement, attendance and health. This problem is of great importance in many of the Canadian provinces and in wide areas of the United States, since the answers to the questions it raises should affect policy of divisional and local boards and of the grant structure of provincial and state departments and offices of education.

The Design of the Study

In order to obtain an answer to the problem of the influence of time spent in school busses upon achievement it was decided to use control and experimental groups at the second, fourth and sixth grade levels. The experimental groups were drawn from children from rural homes who were daily vanned to central schools. The control groups were drawn from children who lived in the immediate vicinity of these schools and consequently did not require transportation. All children involved in the study lived in four rural divisions adjacent to the City of Calgary. Because of their limited numbers almost all the vanned pupils in the grades concerned were included in the experimental groups. The control groups were composed of all the pupils resident in the immediate vicinity of sufficient representative schools to bring the number into conformity with that of the experimental group. Thus, without recourse to more refined but less practical sampling procedures, it was hoped

[3]M. E. Bonney, "A Sociometric Study of the Peer Acceptance of Rural Students in Three Consolidated High Schools," **Journal of Educational Administration and Supervision** 33, (May, 1951), pp. 234-240.

[4]B. C. Munro, **The Structure and Motivation of An Adolescent Peer Group.** Unpublished M.Ed. Thesis, University of Alberta, 1957.

[5]T. Lee, "On the Relations Between the School Journey and Social and Emotional Adjustment in Rural Infant Children," **British Journal of Educataional Psychology,** (June, 1957), pp. 101-114.

that the two samples at each grade level might be regarded as randomly selected and representative of the population of vanned and unvanned pupils of the four large divisions concerned. At each grade level both control and experimental groups originally numbered 200. The unusual mobility of the population in the current period of prosperity, over the fourteen months of the study, reduced sample size materially as is apparent in Table I.

TABLE I

FINAL SAMPLE SIZE OF CONTROL AND EXPERIMENTAL GROUPS OF VANNED AND UNVANNED PUPILS IN GRADES TWO, FOUR, AND SIX IN FOUR RURAL SCHOOL DIVISIONS

Group	Vanned	Unvanned
Grade II	171	144
Grade IV	188	160
Grade VI	167	143

Both experimental and control groups were administered the Stanford Achievement Test, Form J, in January, 1956, and the comparable Form L, in April, 1957, using the level appropriate to the grade. In addition all pupils completed the Otis Quick-Scoring Test of Mental Ability suited to their grade levels. Relative gains in achievement at each grade level were computed for the vanned and unvanned groups. After the linearity of relationship of initial and final scores had been demonstrated, and the uniformity of the variances had been verified, an analysis of covariance was completed to determine whether any significant changes in level of achievement had developed during the intervening period.

The Factor of Intelligence

In order to assess intelligence as the causal factor in differences in achievement between control and experimental groups a test of the significance of differences in mean intelligence was used at the grade two, four and six levels, as reported in Table II.

This evidence suggests that differences in intelligence between control and experimental groups at the second, fourth and sixth grade levels are non-significant, and therefore intelligence cannot be used to explain the significant differences in achievement which later appear in this study.

The lack of significant differences in intelligence as between vanned and unvanned children is worthy of comment in view of the

TABLE II

COMPARISON OF MEAN INTELLIGENCE OF VANNED AND UNVANNED PUPILS IN GRADES TWO, FOUR AND SIX IN FOUR RURAL SCHOOL DIVISIONS

Group	N	Mean	S.D.	Difference	Significance
Grade II					
Vanned	157	103.204	12.524	1.938	Non-Sig.
Unvanned	127	105.142	13.575		
Grade IV					
Vanned	177	98.073	11.926	.301	Non-Sig.
Unvanned	152	98.375	12.725		
Grade VI					
Vanned	156	102.955	11.802	.082	Non-Sig.
Unvanned	134	103.037	10.680		

evidence presented in the fairly definitive Alberta Studies of Carmichael and Rees,[6] Climenhaga,[7] and Pritchard,[8] which indicate that intelligence test scores of urban children are superior to those of pupils from rural areas. While it is true that the vanned children are rural dwellers, they do not suffer the handicaps and limitations of an exclusively rural environment, and, indeed, attend consolidated schools which do not fall far short of town and urban schools in staffing, equipment and size. As a complementary fact, the unvanned group of children live in the villages in which the centralized schools are located, an environment which is not materially superior to that of the vanned pupils with whom they are compared.

The Factor of Attendance

Just as differences in intelligence between vanned and unvanned groups might lead to misinterpretation of findings, so might also a differential in attendance of the two groups, at the different grade levels, lead to serious errors in understanding and interpretation. To forestall such error a study of attendance during the experimental period of fourteen months is reported in Table III.

6Anne Carmichael and Robert E. Rees, "A Survey of Reading Achievement in Alberta Schools," **The Alberta Journal of Educational Research** (March, 1955), pp. 18-33.

7Clarence E. Climenhaga, "A Survey of the Arithmetical Achievement of Grade Eight Pupils in Alberta Schools," **The Alberta Journal of Educational Research** (December, 1955), pp. 35-47.

8Ralph O. Pritchard, "A Survey of the Arithmetical Achievement of Grade Five Pupils in Alberta Schools," **The Alberta Journal of Educational Research** (March, 1956), pp. 41-48.

TABLE III

DIFFERENCES IN SCHOOL ATTENDANCE OF VANNED AND UNVANNED PUPILS IN GRADES TWO, FOUR AND SIX IN FOUR RURAL SCHOOL DIVISIONS

Group	Number	Attendance Means	S.D.	SE.	CR.	Significance of Differences
Grade II						
Vanned	171	256.59	11.17	1.366	1.69	Non-Sig.
Unvanned	144	254.28	12.80			
Grade IV						
Vanned	188	256.33	10.69	1.219	1.17	Non-Sig.
Unvanned	160	257.75	11.86			
Grade VI						
Vanned	167	256.74	9.97	1.066	3.57	Sig. .01
Unvanned	143	260.54	8.79			

The finding that there are no significant differences in attendance between the vanned and unvanned groups in grades two and four over a period of fourteen months is a comforting one, and a partial justification of centralized schools and of the vanning of rural pupils. The fact that there is a significant inferiority in attendance of vanned pupils at the grade six level obviously becomes intelligible only as an outcome of the pioneer practice of keeping older farm boys at home to help in seasonal activities such as seeding and harvesting. This finding aids us in understanding certain deviations in the pattern of achievement which will be reported later, and insures against gross misinterpretation of the findings.

TABLE IV

MEAN ACHIEVEMENT OF VANNED AND UNVANNED GROUPS IN GRADES TWO, FOUR AD SIX IN FOUR RURAL SCHOOL DIVISIONS

Group	Vanned		Unvanned	
	Test I	Test II	Test I	Test II
Grade II	26.029	39.053	25.653	40.479
Grade IV	46.628	59.410	44.000	57.013
Grade VI	63.222	78.066	64.091	78.252

The Influence of Vanning on Achievement

A summary of mean achievement on the initial tests, and on the final tests, which followed after fourteen months, appears in Table IV.

A cursory inspection reveals a superiority in rate of achievement of the unvanned over the vanned group at the grade two level. Tables V, VI and VII present a summary of the covariance analyses.

TABLE V

COVARIANCE SUMMARY OF ACHIEVEMENT OF 171 VANNED AND 144 UNVANNED GRADE TWO PUPILS[9]

Test	Property Tested	F Ratio	Significant Ratio		Result
			5%	1%	
F_1	Difference between Groups —Adjusted for Individual Group Rate of Change	6.45	3.91	6.81	Sig. 5%
F_2	Difference between Groups —Adjusted for Combined Groups Rate of Change	10.40	3.06	4.75	Sig. 1%
F_3	Difference between Group Rates of Change	2.35	3.06	6.81	Not Sig.

TABLE VI

COVARIANCE SUMMARY OF ACHIEVEMENT OF 188 VANNED AND 160 UNVANNED GRADE FOUR PUPILS

Test	Property Tested	F Ratio	Significant Ratio		Result
			5%	1%	
F_1	Difference between Groups —Adjusted for Individual Group Rate of Change	0.431	3.03	6.73	Not Sig.
F_2	Difference between Groups —Adjusted for Combined Groups Rate of Change	0.823	3.87	4.68	Not Sig.
F_3	Difference between Group Rates of Change	0.037	3.03	6.73	Not Sig.

[9]The procedure used for the analysis of covariance was adopted from J. F. Kenney and E. S. Keeping, **Mathematics of Statistics**, Part Two, D. Van Nostrand Co. Inc., Toronto, Ontario, 1953, p. 274.

TABLE VII

COVARIANCE SUMMARY OF ACHIEVEMENT OF 167 VANNED AND 143 UNVANNED GRADE SIX PUPILS

Test	Property Tested	F Ratio	Significant Ratio		Result
			5%	1%	
F_1	Difference between Groups —Adjusted for Individual Group Rate of Change	0.552	3.87	6.73	Not Sig.
F_2	Difference between Groups —Adjusted for Combined Groups Rate of Change	0.520	3.03	4.68	Not Sig.
F_3	Difference between Group Rates of Change	0.584	3.87	6.73	Not Sig.

In the three summaries of covariance F_2 is the better test of the significance of the differences in achievement of the two groups since the variances used in F_2 are better estimates of the population variance.

In Table V the F_1 test reveals a difference in achievement in favor of the unvanned over the vanned group of grade two pupils at the .05 level of significance. Under the more effective F_2 test the difference favoring the unvanned pupils attains the .01 level of significance. This must be interpreted as meaning that the vanned group of 171 grade two pupils made significantly poorer progress than the unvanned group of 144 grade two children. This does not mean, however, that the lower achievement of the vanned children was attributable entirely to the harmful effects of time spent in school busses. It does mean that their progress was retarded by factors probably relating to rural life, among which must be listed the time spent in busses coming to and returning from school.

Tables VI and VII reveal no significant differences in achievement of the vanned and unvanned groups at the grade four and the grade six levels. Subject to limitations in sample size, and the fulfillment of the major assumption of the randomness of the samples, it would seem that the factor or factors producing inferiority of achievement in the vanned pupils in grade two cease to be effective at the grade four and grade six levels.

Summary of Findings

1. No significant differences in intelligence between vanned and unvanned pupils existed at the grade two, four or six levels.

2. Differences in attendance between vanned and unvanned pupils are not in evidence in grades two and four, but become significant to the disadvantage of the vanned group at the grade six level.
3. The vanned group of grade two children were significantly lower in achievement than the unvanned group. No significant differences in achievement were found at the grade four or the grade six level.

Expansion of Findings

1. The intelligence of children vanned from farm homes was not found to differ significantly from the intelligence of the unvanned children resident in the villages in which the centralized schools are located. This finding suggests that the modern rural home provides as rich an environment as does the village or market town, when educational opportunities are equal. This finding removes intelligence from consideration as a causal factor in the one case where differences in acahievement of the vanned and unvanned groups of children occurred.
2. The inferiority of attendance of vanned children in grade six must be attributed to the practice of keeping older children at home to aid in seasonal farm operations. The absence of differences in attendance at the grade two and grade four levels probably supports the wisdom of the practice of vanning rural children to school since the effective system of school transport appreciably facilitates regular attendance.
3. The inferiority of achievement of the vanned group at the grade two level must be regarded as evidence discouraging the longer bus routes for children in the lower grades. Since no significant difference in achievement are apparent at the grade four and grade six levels it must be inferred that vanning is not injurious to the achievement of pupils in these grades.

Required Research

In the light of the evidence provided by this study, it is now possible to restate the problem in a manner which may provide guidance to future research workers. First of all, the time spent in a school bus daily is likely only a part of the longer and more exacting day of pupils who live on farms. If this is so the time spent on a school bus could be misleading when treated in isolation. It would seem that farm children may rise earlier, do chores around the farm or home, and walk to the point at which they catch the bus, with the process repeated in reverse in the late afternoon. This

would result in a day of extended length and effort as compared to the day of a child who lives in the vicinity of the school. If this is the case the total length of the day, and the nature of the activities engaged in would be more important as predictors of diminished achievement than the actual time spent in the school bus. The fact that inferiority in achievement is demonstrable only in the grade two vanned group suggests that the children of the first two or three grades lack the strength and endurance required to overcome the adverse effects upon academic achievement of their longer and more fatiguing day. The findings of Bonney, Munro, and Lee must also be reviewed since degree of acceptance and quality of adjustment appear important factors influencing the achievement of vanned pupils, although the influence of these factors is not apparent at the grade four and grade six levels.

Future research workers must attempt to measure additional variables such as length of waking day, tasks and chores performed about the farm and home, and distance walked to the point at which the school van is met, time in transit in the school bus, as well as the acceptance and adjustment of vanned pupils, if they are to predict more accurately the impairment of achievement which is anticipated.

Implications

For Educational Authorities

1. A significant impairment of academic achievement of children in grades one and two does exist in the sample studied. It apparently disappears before grade four.
2. This impairment seems due to a combination of factors: the lower strength and resistance to fatigue of the younger children, certainly, and probably the longer waking day of farm children; perhaps chores and tasks performed by these children, as well as the actual time in the school bus, and the time required to get to the point at which the bus stops for its passengers. The degree of acceptance of vanned pupils and the quality of their adjustment to the total situation may also be factors requiring consideration.
3. The evidence discourages lengthening of bus routes for children in the lower elementary school; time in bus is only one of the factors, however, accounting for the fatigue which results in diminished achievement. Parents and administrators must attempt to control the other factors suggested as contributing to the heavier school days of these children.

For Parents of Vanned Children

1. Children of the first three grades are likely to have reduced academic attainment as a result of various factors including the longer and heavier school day.
2. While it is true that long bus routes contribute to the length of the school day, parents can lighten it appreciably by insuring that their younger children:
   (1) Have as much sleep as is practicable.
   (2) Are released from chores and duties which extend their waking day.
   (3) And are conveyed to the point at which the bus calls for them daily.

EVALUATIVE CRITERIA OF PROVINCIAL LEADERSHIP IN PUBLIC EDUCATION

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The purpose of this paper is to establish criteria for the evaluation of provincial leadership in the field of public education. The application of these criteria in an appraisal of the central administration of instruction within the Province of Alberta is reviewed briefly in the second section which summarizes a study on the provincial administration of high school instruction.[1] The data providing the basis for this study were drawn from the records of central leadership in education over the first fifty years of Alberta's history.

I. Evaluative Criteria

"A plan whether for a state, for an apartment house, or for advanced education is the product of applied criteria."[2] Criteria are, in effect, principles growing from the field of theory and practice that serve to crystallize current thinking and to provide guides for action. One major purpose in evaluating present practice is to discover the need for change and the direction it should take. Criteria should establish guiding principles useful for long range planning which, at the same time, recognize the immediate problems presented by legality and tradition in making this planning effective. To that extent a criterion should be an expression of common sense.

The criteria outlined here have been drawn largely from the literature on state leadership in the United States. There applicability to central leadership in the Canadian provinces has been validated by reference to a comparative study of design and structure in the public school systems of the two nations. The conclusion reached through this study was that, while administrative structures differed in accordance with constitutional practice, the conceptual designs of the national systems were similar.[3] This implies a common set of values directing the course of public education, a similar allocation of constitutional responsibility, and a pattern of relationships between central and local governing agencies bearing marked

1T. C. Byrne, "The Historical Development and an Evaluation of Provincial Leadership in the Field of High School Instruction for the Province of Alberta," unpublished Doctoral Dissertation, University of Colorado, 1956.

2Russel V. Black, "Criteria and Planning of Public Works," **Federal Emergency and Administration of Public Works, National Planning Board**, p. 27.

3T. C. Byrne, "Design and Structure in Canadian Education," **The Alberta Journal of Educational Research**, Vol. III, No. 1 (March, 1957), pp. 28.-43.

resemblances. Organization and practices in central administration differed, but the basic concepts in design reflected similar historial and environmental influences.

The six criteria developed in this study may be classified into two broad aspects of administration. The first criterion is regulatory in effect and is related to the inspection services of the central department. The remaining five reflect the leadership or service aspects of central administration.

Reference is made throughout this paper to the total administrative process involved in the provincial administration of instruction. Sears, in an anlysis of this process, enumerates its phases as planning, organizing, directing, co-ordinating and controlling, each of which he defines in an attempt to clarify the problems of administration by local and central agencies of school government[4]. According to Sears, planning involves preparation for action and is an essential part of action itself, so that it interacts with direction, organization, co-ordination, and control. The organization is the machine for doing work which may be composed primarily of persons, but also of materials, ideas, concepts, forms, rules, principles, or a combination of these. Direction represents authority at work exercised by individuals, by knowledge and by social forces. Co-ordination seeks to move all parts of the complex system, including many purposes, processess, people, and things, together in harmony to achieve a unity of effort. And finally, control provides the means by which the action is directed through force or by law, policies, regulations, instructions and plans, or by tradition, customs or professional ethics. These phases of administration contribute to, and are part of, the all-embracing process by which the constitutional authority vested in the legislative assembly is made effective in the schools of the province.

1. *The province should established through its administration a minimum or basic school program*

This criterion implies that a province (or state) should require all public school systems within its borders to reach a pre-defined adequate standard in public education, a power which this unit of government possesses by constitutional right. That provincial legislatures have been granted this authority reflects an acceptance by society generally that an educated citizenry is essential to national well being. One statutory effort to assure this resides in the compulsory attendance law now almost universal in school legislation.[5] In giving effect to a compulsory attendance law, the legislature must insure that the instructional program justifies its legal imposition.

[4]Jesse B. Sears, The Nature of the Administrative Process, p. 32.
[5]Fred F. Beach, The Functions of the State Department of Education, p. 11.

Furthermore, the province's complete responsibility for all public education points up the need to be concerned with a foundation program throughout the entire school period.

The establishment and maintenance of a minimum program is, therefore, a regulatory function of primary importance in central leadership and one which the executive arm of government cannot avoid.[6] The method of its development through adequate instructional service is a problem of such complexity that no simple solution will provide an answer. One major difficulty in setting forth the foundation program resides in the fact that planning frequently results in quantitive rather than qualitative demands. Despite this, efforts to guarantee basic education to all citizens remains a valid, though complicated, governmental concern. Furthermore, the essentials of this program should not be static but should be reviewed as general understanding of the educative process grows and as the public's capacity and willingness to grant financial support increases.

While a corollary to the central regulation of basic education should be financial aid to those districts unable to provide the minimum in educational service, provincial or state responsibility cannot be limited to monetary grants on the assumption that these alone will guarantee adequate education. From researches in the State of Connecticut, Chase and Switzer concluded that "A high level of financial support makes possible but does not assure an effective educational program."[7] The central authority cannot abdicate from its exercise of both regulatory and leadership functions which are to maintain a minimum educational program and to create a vigorous system of public education. A foundation program does not necessarily mean uniformity in educational achievement.[8]

2. *The central department should exercise leadership through overall planning in public education*

The need for central planning by individuals or committees grows from the general character of school law which provides authority but does not specify methods for making it effective. The intent of a general law is that authority should be held in abeyance until science and philosophy have been applied in the specifics of planning.[9] The development of detailed legislation by provincial or state legislatures governing the conduct of schools fails to recognize two significant influences creating needs for flexibility in the application of school law: that cultural change in society is in-

[6]American Association of School Administration, "The American School Superintendency," **30th Yearbook**, p. 396.

[7]Frances Chase and Robert Switzer, "State Governments and Education," **Review of Educational Research**, No. 4 (Oct., 1952), p. 346.

[8]**Beach, op. cit., p. 12.**

[9]**Sears, op. cit., pp. 43-50.**

evitable, and that research is continually adding to our knowledge of more effective procedures in education.[10] The planning function of the central department derives from the problem of interpreting the general law authorizing the operation of a province-wide system of schools in terms of current needs and evolving theory.

Co-ordination as a phase of the administrative process in public education should be exercised by provincial departments through broad planning for instructional improvement at the school level. Chiara, in a study of the curriculum programs of forty-eight states, concluded that state leadership was needed in "identifying and resolving problems confronting education so as to facilitate curriculum improvement."[11] The state or province is an entity in cultural growth and, as such, has problems common to all school systems and unique to its developing culture. Long range planning in terms of social and economic trends requires a breadth of experience with the total school system as well as a vision in provincial development which the central department alone possesses.

Planning in the administrative process implies control, but the control associated with central planning should be largely moral and persuasive rather than regulatory, the purpose being to stimulate local growth through the broader vision of central leadership. Provincial planning followed by directives tends to destroy or prevent the partnership in instructional improvement between central and local authorities which is essential for its success. Authority flows downward from central to local government but the delegation of power must be a genuine transfer with mutal understanding of its obligations and limitations.[12]

Provincial planning should involve professional and lay people widely. Local systems should be called upon to participate in planning so that communication becomes a two way process with the provincial department providing both direction and focus in policy growth. Central planning should be open ended and continuous. Recognizing that curriculum development is an ongoing process, the planning leadership of the provincial department should be equally flexible in its sensitivity to the changing nature of modern society.

3. *The central authority should grant freedom to and encourage the local school and community to plan and adjust school programs to meet local needs*[13]

This criterion recognizes that a major share in the planning of

10 **Ibid.**

11 Clara Chiara, "A Critical Study of the Secondary School Curriculum Programs of the State Department of Education," Unpublished Doctoral Study, Columbus, Ohio State University, 1958, p. 465, cited by Chaser and Switzer, **op. cit.**, p. 347.

12 **Sears, op. cit., p. 277.**

13 **William Alexander, State Leadership in Improving Instruction, p. 33.**

school programs should take place at the centre of action in the educational system, and that those who execute the plans will do so more effectively if they are part of the planning process.[14] The criterion derives from the thesis that the school's curriculum is essentially experiential and that the teacher is the most important agent in the development of effective learning experiences.[15] It reflects, further, the assumption that instructional improvement takes place only as those most directly concerned acquire new perceptions of the professional task.[16]

The close relationship of curriculum and supervision is recognized in this evaluatory principle. Supervision vitalized by curriculum study operates most effectively through the inservice education program which is primarily developed through local leadership.[17] Planning for instructional improvement offers a challenge that affords rich opportunities for professional growth, a basic condition for which is freedom to make decisions on the basis of the best available evidence.

Granting freedom to local authorities in the development of curriculum does not preclude or lessen the importance of planning at the provincial level. The province cannot avoid responsibility centrally nor disregard failure locally to achieve a foundation program of education. Methods of exercising leadership will differ, however, according to purposes.

Failure to recognize the criterion results when provincial legislatures enact legislation directing with considerable specificity what should be taught in the schools. It is transgressed by central departments that issue prescriptive courses of studies crystallizing the major share of planning prior to and apart from the learning situation. The tradition of prescription frequently lingers on long after central departments have ceased to publish specific directives, pointing up one major problem associated with any move to decentralize curriculum planning and control. Provincial officials concerned with developing broad professional competence among school personnel should actively encourage teachers and administrators to participate in local curriculum studies.

4. *The province (or state) should exercise leadership through a co-ordination of different phases of the instructional program and of the efforts of local school systems*

Co-ordination is an important aspect of the administrative process; it is really, however, an entirely separate activity.[18] Co-

[14]Sears, op. cit., p. 72.
[15]Harold Alberty, **Reorganizing the High School Curriculum**, p. 523.
[16]Alice Miel, **Changing the Curriculum, a Social Process**, p. 10.
[17]Harold Spears, **The Teacher and Curriculum Planning**, p. 116.
[18]Sears, op. cit., p. 197.

ordination is involved in planning; it is also a part of organization and control. Planning loses its effectiveness through a lack of co-ordination if different aspects of the school program are planned in isolation. Co-ordination may be defined as the process which fits the various parts of the school system together, welding them into a functioning whole. It can be achieved best by a leadership that keeps the central purpose of public education in sharp focus before the diverse groups that contribute special competencies in different areas of the school program.

The importance of co-ordination in state school adaministration has been stressed by Grace in this quotation, "This development of an adequate educational program is contingent on the willingness of (the) many integral parts of our system to work as a unit."[19] Central departments have, of course, problems of co-ordination much wider than those bearing directly on instruction, such as those concerning buildings, transportation, budgeting, and pupil accounting. Within the instructional field the relationship of guidance to teaching, of audio-visual education to the curriculum process, of in-service training to curriculum development, are illustrative of pertinent problems of co-ordination. Co-ordination may be vertical, this is, concerned with articulation of elementary and high school programs. It may be horizontal in its attempt to relate all factors bearing on classroom instruction at a given grade level.

The provincial department may exercise leadership through the co-ordination of the efforts of various school systems by serving as a medium through which local officials may share experiences in the administration and supervision of instructional programs. Stimulating and guiding local experimentation and disseminating information as to its success are co-ordinating services that a central department can best perform.

Co-ordination grows from the application of sound principles of organization in the structures of the central department. In order to co-ordinate supervisory and curriculum services, these should be in one department, under a common leadership dealing with the broad problems of instructional improvement at the provincial level. Vocational and general education should be the exclusive responsibility of one central board of education rather than a divided responsibility between two governing authorities as is the case in some of the United States. The principle of organization by function is the one most applicable to the internal structures of provincal departments.

19Alonzo Grace, "Planning Functions of State Departments of Education," **School Executive LII** (February, 1944), pp. 47-48.

5. *The province should provide direct services to local school systems in the development of instructional programs*

The services to which this criterion refers are those involving direct assistance through materials and personnel to local agencies, for instructional improvement. While the maintenance of the minimum program is one concern of these services, their major aim should be the continuous improvement of instruction in provincial classrooms. Services can be, however, an important aspect of central control, by providing assistance to school systems in planning and in translating plans into action.

The service function is becoming one of major concern to authorities in the field of central leadership. Under its broad definition Grace would include such services as identifying problems and issues, providing a centre for information, developing curriculum guides, and directing programs of evaluation and experimentation.[20] The National Council of Chief State Officers suggests that all services should be planned to encourage local interest in responsibility for policies and projects in educational improvement.[21]

The provincial department should provide services in the form of written materials. Curriculum guides which represent crystallization in central planning are invaluable aids in the development of the educational program locally. Other curriculum materials both visual and auditory may come within the service areas of central departments as films, radio and television programs, and correspondence courses. Publications that assist local systems in curriculum studies are probably one of the more effective contributions of province-wide services.

The central department should provide personnel to serve as consultants to local systems in their curriculum development and in-service education programs. That this type of advisory service has been recognized as useful by central departments in the United States is reflected in the following quotation from Cocking and Gilmore, "State departments have developed techniques of co-operation through providing advice and information to local administrators."[22] In answer to an inquiry included in a recent survey as to the most useful service rendered by their supervisory staff, chief state executive officers replied "to assume leadership for the proper building of curriculum and to advance ideas and execute plans to insure more progressive programs of work."[23]

20Alonzo Grace, "Instructional and Curriculum Services," **School Executive**, LXVI (July, 1957), pp. 46-47.

21National Council of Chief State School Officers, **Our System of Education**, p. 21.

22Walter Cocking and C. H. Gilmore, "Organization and Administration of Public Education," p. 122.

23Association for Curriculum and Supervision, "Leadership through Supervision," **1946 Yearbook**, p. 49.

6. *The provincial department should exercise leadership in the field of research*

"Democracy governs by authority, knowledge, and good will through a united staff, an informed and purposeful team."[24] Control results from a co-ordination of functions, from an "interweaving of experience", of those concerned with the total educational task and, as such, becomes a self-generating process resulting in collective self-control. Knowledge and understanding are basic to the smooth operation of the complex organization translating school law into practice. The development of this knowledge is the role of research.

Research is essentially a staff function of service in several phases of the administrative process. Planning is dependent on research; in effect, research is the core of planning.[25] Organization and modifications in the organizational structure should develop from the objective and carefully developed study implied by research procedures.

To separate research from action is a misapplication of the division of labor principle that occurs when research is the exclusive function of the college or university.[26] The central department should evaluate research findings, converting them into products meaningful to teachers and school administrators and useful for the improvement of instruction.[27] In this sense the provincial department acts as a clearning house for all types and kinds of research developed by universities, institutes, and local school systems.

The provincial department should operate a bureau of research to secure objective evidence for the solution of problems within the provincial system. This enterprise recognizes the close relationship between research and the educational task and the need for a continuous study of the problems of instructional improvement. The co-ordination of research throughout the province and the stimulation of local systems to engage in research would be a legitimate function of this bureau.[28] An important contribution of central leadership can result from the establishment of pilot studies among a small group of schools which may serve to stimulate improvement throughout the entire system.

24Sears, **op. cit.**, p. 300.

25Beach, **op. cit.**, p. 4.

26Sears, **op. cit.**, p. 290.

27E. L. Lindman, "Research Service on the State Level," **School Executive**, LXVI (July, 1957), p. 48.

28Lawler and Lawler, "State School Organization and Administration," **Review of Educational Research**, XIX, No IV. (Oct. 1949), p. 344.

II. Application of Criteria to Provincial Leadership in Secondary Education in the Province of Alberta

The data for this phase of the study under review were drawn from the records of provincial leadership in secondary education over a fifty-year period. The sources of data were the annual reports of the Department of Education, sessional papers recording the planning of government commissions, and other pertinent documents. A summary of the data organized under the different phases of the administrative process is included in this section of the paper. The conclusions reached through an analysis of the data in terms of the criteria from a part of this review as well.

Planning

The readiness and capacity of the provincial Department of Education for leadership through curriculum planning was demonstrated early in the history of the province. Three major revision periods, along with the continuous study carried out over the past ten years, mark the planning stages of the present high school program. Provincial planning has been characterized by continuity reflecting, in its development, the changing needs of the province, the influence of educational theory, and the effects of administrative experience within the Alberta high school system. Moving from a strictly academic high school program, planned through the first revision in 1912, the second committee in 1924 broadened its scope to include six distinct curricula. The third committee in 1939 swung the course of high school education back to a common curriculum having a wide range of electives within its framework to provide for both special and general interests, permitting, in theory at least, individualized student programming. Recent planning by contemporary committees has modified the reorganization of the provincial group responsible for the third revision, but has made no major alterations in the high school curriculum.

The influences on planning have been analyzed in the study to discover more fully the nature of the planning process. Because of the close political control over education typical of Canadian provinces, the relationships between party interests and educational leadership were reviewed. It was concluded that the development of provincial school policy has been marked by continuity and non-partisanship irrespective of Alberta's changing and turbulent political history. The influence of the University of Alberta on high school education, exercised through the external examination and through prerequisite courses for matriculation standing, has been noted. The co-ordination of lay and professional thinking in the planning of provincial groups since 1918 is revealed in the documentary records of the province's educational history.

While the major emphasis has been on the structures, processes, and products of central planning, the study explored the products of local planning and the problems associated with stimulating local creativity in planning at the school or district level. The technical education and guidance movement, and the organization of composite high schools illustrate worthwhile adaptions that were the fruits of local invention. That central planners have recognized the need for a sharing of planning responsibility with local school authorities is apparent in the various attempts by provincial curriculum committees to stimulate local initiative since 1922, all of which have proved relatively ineffective. The predominant role assumed by the provincial authority early in Canadian history, in planning, organizing, directing, co-ordinating, and controlling instructional programs tends to limit local administrative efforts to the externa of the high school system.

Organization

The present structures for central planning have evolved from provincial experience in the exercise of leadership during the first half of the twentieth century. The provincial committee having a curriculum or program building orientation, with a membership including both lay and professional personnel and chaired by a departmental official, had become a typical planning structure by 1922. The internal organization of the Department of Education along functional lines, facilitating thereby committee study and providing for continuous leadership to curriculum development, had taken shape by 1919 with the appointment of the Supervisor of Schools who was, in effect, a curriculum director. The division between planning and control, that is between the curriculum and inspection services, was achieved by the separation of these two functions into distinct branches in 1919. The need for their co-operation, realized more fully through the influence of educational theory stressing the close relationships between curriculum and supervision, was recognized and met by the establishment of a common leadership over the two branches in 1945.

Direction and Control

The distinction between these two phases of the administrative process is not easily drawn, as an instrument of control also provides direction for the flow of authority from legislature to school. The exercise of central control has evidenced itself through the employment of prescriptive courses of study and provincial textbook authorizations. The external examination served as the major administrative device for maintaining the minimum program until 1936 when a limited type of local autonomy was introduced for

Grades X and XI. Since this time Departmental control over promotions has been exercised in the terminal year only, and largely for university entrance purposes. School inspection maintained its regulatory emphasis until 1935 at which time the act reorganizing local school government altered the relationship of the public school inspector to the local authority in the direction of service or leadership.[29] The high school inspector still performs both regulatory and service functions through his advisory role to superintendents and school boards.

Criterion One (Maintenance of minimum program)

On this criterion the efforts of provincial leadership rank high. The province has not only defined and planned the minimum or foundation program but it has developed, as well, through regulation and inspection, effective media of control for its establishment and maintenance. In the dimension of breadth the province has regulated the basic program for small schools at the same time providing desirable direction for expansion within the curriculum for larger centers. In the dimension of depth, as applied to specific subjects, provincial leadership has been effective in developing a foundation program which, however, tends to restrict rather than encourage local planning for instructional improvement.

Criterion Two (Leadership in overall planning)

The conclusion is that provincial leadership rates adequately on the planning criterion. It has been characterized throughout by a readiness to accept responsibility for planning, by direct assistance to local units, by an involvement of lay citizens in the planning process and by an adaptability to changing needs within the provincial system. If weaknesses exist, they result from the highly centralized character of provincial planning which fails to encourage or develop a province wide participation in the planning process. This defect is related to the evaluation of provincial leadership under criterion three.

Criterion Three (*Encouragement of local initiative in planning*)

Provincial leadership cannot be rated high on this criterion. Considerable freedom of decision exists locally with respect to the breadth of program. Once these decisions have been made, however, the local unit operates within the scope of strong central direction and control on all matters pertaining to specific courses. This has the effect of separating planning for instructional improvement from the point of action, the school itself, creating habits of dependence on the central authority which frequently militate against the development of local initiative in the solution of instructional problems.

[29]**Statutes of Alberta 1936, C85, Sec's. 274c.**

Criterion Four (Leadership through co-ordination)

Generally provincial leadership ranks high on this criterion, the effectiveness of the co-ordinating function being enhanced through the careful planning, clearly defined direction, and adequate controls that characterize the administrative process of the province. Structures are developing for the co-ordination of local efforts in the improvement of instruction, the full value of which can only be achieved through the stimulation of local initiative in planning activities. The problem here is to distinguish between the co-ordination and control of local planning, in order to avoid a type of co-ordination that verges on direction militating thereby against the development of genuine local creativity.

Criterion Five (Provision of service)

Provincial leadership ranks high when evaluated by the criterion of adequacy of service to local school units, the variety of services rendered and personnel provided giving support to this conclusion.

Criterion Six (Development of research)

Provincial leadership when evaluated by this criterion must be rated inadequate. The province has not had, nor does yet have, a research service engaged in the development of the knowledge necessary for the most effective planning and co-ordination, and for a more informed type of administrative control.

III. Summary and Conclusions

1. The provincial Department of Education should perform the following functions in order to meet the criteria for effective instructional leadership outlined in this study:
   (i) Plan, and maintain the foundation or minimum program.
   (ii) Provide for over-all long range educational planning.
   (iii) Stimulate and encourage local creativity in planning.
   (iv) Co-ordinate the administration of the instructional program for schools within the province.
   (v) Provide necessary services to local school units.
   (vi) Establish and maintain a program of educational research.
2. In its record of instructional administration the Alberta Department of Education rates high on the first, second, fourth and fifth criteria. The Department has maintained a foundation program, planning effectively at the provincial level, co-ordinated the many facets of educational administration, and provided extensive curriculum and supervisory services.

3. The Department has not yet discovered the most effective methods of decentralizing planning to achieve local initiative and creativity within the provincial system. This remains a major problem for central leadership.
4. The Department has not yet established a bureau of research.

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PUPILS AND TEACHERS LEARN TOGETHER

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Action research has been defined as "a cooperative attempt by a group of practitioners to clarify objectives and improve practice by accumulating and evaluating pertinent evidence as they carry on daily tasks".

In our case the practitioners were six teachers, and their daily task was to guide and promote the educational growth of one hundred and forty-one (junior high school) pupils. The teachers had various backgrounds of experience and years of training. Classroom experience ranged from none to six years, while years of University study ranged from one to four. Only two of the group had previous experience in grades where reading is usually taught as such. However, they had something in common, the interest of the pupils and the desire to do a good job.

The Problem

During the month of June, as regular procedure, the Sangren-Woody Reading Test had been administered to the pupils of grades 6, 7, and 8. The results showed that 38.8% of the children were reading below grade level—some by as much as three and one-half years. Of those who were entering grade nine, 56.1% appeared to be deficient in the necessary skill. The teachers felt that there was a need for some form of remedial reading for these pupils and tentative plans were then discussed.

Early in September the teachers met with the principal. The new members of the staff were apprised of the situation and after some discussion it was decided that the problem was really two-fold:

(1) A large percentage of the junior high pupils were reading below their grade levels.
(2) The teachers and principal had very little knowledge of corrective measures that might be taken.

The teachers agreed, however, to study the subject and tackle the job, for better or worse. The principal agreed to obtain books, equipment, and supplies, and a project was launched.

Procedure

The grade seven pupils were divided into two groups and the grades eight and nine pupils were divided into four groups according to their rating on the June test. The following groups were formed:

Grade	Group	No. of Pupils	Reading Level
VII	A	28	7.8 to 10.1
	B	28	5.3 to 7.7
VIII and IX	C	27	9.1 to 10.1
	D	17	8.1 to 9.0
	E	22	7.1 to 8.0
	F	19	4.6 to 7.0

The two groups of grade VII pupils met as separate classes for five periods a week from September to the end of February. During this time the groups formed from the pupils of grades VIII and IX met for two periods each week. For the superior groups, A and C, emphasis was placed upon literature and free reading, while the remaining groups were given a remedial reading program.

During the first week of the project the California Achievement Test (AA) was administered to all pupils for two purposes. First, it was hoped, from the study of the various sections of the test, to be able to determine specific areas of weakness and individual differences. It is to be admitted, however, that little use was made of individual diagnosis because of lack of experience in this field. The second objective was to establish a bench mark against which the value of the remedial program might be measured by using the alternative (BB) form of test at a later date.

Remedial measures varied from group to group and were by necessity largely trial and error. Many devices—flash-cards, rate-ometer and eye-span trainer—were used. Reading exercises were taken from several sources and many books of high interest—low reading level were used.* Ideas grew out of individual study and group discussion. Help was received from the Superintendent, from primary teachers; and the Fall Convention, having for a theme, "The Teaching of Reading", brought expert advice and encouragement.

As the program progressed the principal was given the opportunity to observe lessons as carried out by individual teachers and several staff meetings were devoted to discussion of methods and assessment of results. Out of the many individual suggestions and experiments there grew a procedure that was carried out, with slight variation, by the teachers in charge of the four groups of low reading ability.

Lessons began with some form of flash-card drill in an attempt to increase eye-span and to make the pupils aware of this need.

*Mr. M. O. Edwardh, Assistant Director of Curriculum, has prepared "A List of Books for Reluctant Readers". This may be obtained, on request, from the Alberta Department of Education, Edmonton.

There being only one eye-span trainer available, two teachers made use of a window blind, an improvised trainor, but one clearly visible to the whole class. An opening was cut in the blind to expose a word or phrase when the blind was released. This worked in a manner similar to that of the device produced for individual use.

Part of the time allowed for each lesson was spent on word analysis and phonics followed by exercises designed to increase vocabulary and strengthen comprehension. Time for this work varied according to the need of the group. Groups E and D were given more experience in reading different types of material for more definite purposes. That is, exercises were used to develop skills such as skimming, reading for retention, and reading to find the main thought.

The latter part of each period was given to free reading. With the exception of groups B and F, grade level books were used. Every effort was made by the teachers to stimulate interest and to encourage the pupils to read for pleasure. Many books of high interest and low reading level were obtained and used with the lower groups. The teachers were lavish in their praise of these books. One teacher reported that she was having difficulty in supplying the demand from pupils who had previously shown no interest in reading. It was further felt that this type of material might form the core of a future remedial reading course.

Only one rateometer was available, but during the course of the project, sixty pupils volunteered to use the machine for fifteen minutes a day for a period of one month. Testing, at the end of this period, showed increases in rate of reading ranging from seventy-five to one hundred and fifty words per minute. Later testing indicated that much of the gain was not retained, due, possibly to the lack of long term motivation and transfer of technique to every day reading. However, it was felt that this machine could be of real value if its use could be given more thought and planning.

Little mention has been made of the two superior groups. Some time was spent with exercises designed to over-come weaknesses in vocabulary, as indicated in initial testing, but, as previously stated, their program was largely in the field of literature—prose and poetry. In an effort to develop deeper understanding and greater appreciation, selections were studied in some detail. Stories were studied for structure—plot, characterization, description and detail. Consideration was given to the various types of prose, such as the narrative, the essay, the radio play, and the news story. The study of poetry was done in much the same manner, emphasis being placed on the purpose of poetry, expression of feeling, rather than on techniques. The works of several poets were studied for style,

rhythm, and figurative language. The pupils were encouraged to write and were given ample opportunity for self-expression with some very pleasing results. The teachers found these groups a pleasure to work with, because they felt that the entire group was reached by each lesson, whereas, in an ordinary class, with a reading range from 5.1 to 10.1, teaching would be directed to the average, held at a much lower level, and differently approached.

Results

Testing all the pupils with Form (BB) of the California Achievement test, after a period of five months, showed an average growth in reading of 6.75 months, or 1.75 months above the expected normal growth. Considering the groups separately, the following results were observed:

Grade	Group	Av. Growth in Months	Ranges of Growth in months
VII	A	7.3	0-16
	B	9.5	1-18
VIII and IX	C	3.1	0-14
	D	9.1	0-21
	E	5.3	0-15
	F	6.3	0-16

As groups A and C were given very little in the way of remedial work it was of interest to note that when these groups were excluded from the calculations the average growth became 7: 55 months. From still further analysis of the original data it was found that when only the pupils who were reading below grade level in September were considered, the average growth was 8.16. Here the greatest average growth, of 9.7 months, occurred with the pupils of grade VII, who had had five periods a week, while the pupils of grade VIII and IX with two periods a week, obtained average growths of 7.9 months and 6.9 months respectively.

It is interesting to compare the reading results with the results in other courses obtained by the grade IX students on the Departmental Examinations in June. The following tabulation gives the percentage of students obtaining the various gradings in each subject written:

Standing	Reading	Lit.	S.S.	Lang.	Math.	Sc.
H	6.1%	0 %	2 %	0 %	2 %	0 %
A	20.4	12.2	12.2	14.2	18.3	6.1
B	36.6	42.6	40.5	38.4	32.2	38.4
C	28.5	30.5	28.5	38.4	36.6	28.5
D	6.1	14.2	18.3	6.1	10.2	22.4

The above suggests that instruction in reading improves reading, and that acquired skills do not necessarily carry over into specific fields where reading is important.

Conclusions

The first question was ,"Did the students gain from the project?" There was unanimous agreement in the affirmative. It was felt that there was evidence that:

(1) There had been an over all improvement in reading ability.
(2) The improvement in reading was greatest where the need was greatest—among those pupils who were reading below their grade level.
(3) There had been increased interest in reading for pleasure.
(4) Many pupils had come to realize that there were ways and means of improving the various skills needed for reading.

During the final evaluataion it became apparent that the project had produced a valuable by-product—the professional growth of principal and teachers. It was quickly agreed that much more could have been accomplished if fore-sight had been as keen as hind-sight. For a future effort of this nature the following suggestions for improvement were noted:

(1) Remedial measures should be based on more professional diagnosis of individual difficulties.
(2) The results of I.Q. testing should be known and considered along with diagnosis and assessment.
(3) Parents should be made aware of the need, and of measures being taken. Their cooperation should be solicited.
(4) There should be provision for pupils to move from one group to another as progress warrants.
(5) A much wider use should be made of the books prepared for the reluctant reader.
(6) Provision should be made for pupil self-evaluation. Motivation is high when progress is evident.
(7) More attention should be given to critical reading and reading in specific areas.

Although the fore-going might be thought of in terms of negative results or learning through mistakes, there was also professional teacher growth in a positive sense. There was obvious gain for each individual in knowledge of, and facility in, teaching techniques. A

deeper appreciation of the value of cooperative effort was developed and possibly for the first time the principal and teacher felt at ease working together in the classroom. Individuals gained in confidence as each week brought a greater sense of worthwhile achievement. Enthusiasm was contagious. It spread from teacher to teacher and from teacher to pupils. It was discovered that pupils were willing to accept instruction apparently much below their grade level if they knew the reason and could see progress. There was improvement in the general tone and attitude of the entire school.

It was agreed that,

(1) The teaching of reading should not stop with the elementary school.
(2) The junior high school has an obligation to both the weak and the strong reader as each can improve under proper guidance.
(3) A similar program should be carried out during the following year.

Ironically enough, when September came only one of the seven teachers returned to the same school, the others having gone their separate ways. The one remaining, however, in his new role of vice-principal, is initiating a revised reading project.

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ADMINISTRATIVE SIGNIFICANCE OF PSYCHOLOGICAL DIFFERENCES BETWEEN SECONDARY TEACHERS OF DIFFERENT SUBJECT MATTER FIELDS*

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A. *The Problem and Hypotheses*

Relationships among school personnel as they impinge upon the conduct of the school as an enterprise have received much attention in educational administration. Studies in leadership, morale, role relationships, and informal organization have thrown light directly or indirectly upon the importance of shared purpose and upon the possibilities of increasing it in the interests of more effectively accomplishing the aims of the schools.

Many studies in sociology and psychology indicate that one factor of importance in the increase of shared purpose is the similarity and difference of values and attitudes within the work group. Attempts have been made to relate some of the many variables in the school situation (such as teaching effectiveness) to value and attitude differences, but, in general, the patterns of occurrence of these differences remain unclassified and unpredictable.

Recent findings indicate, however, that the subject matter field of teachers may be a useful basis of classification for patterns of differenecs in personality needs, values, and attitudes. The problem of this study is to detect difference between subject matter groups of teachers in needs, values, and attitudes; to account for these differences; and to determine whether or not they are related to variables which have administrative significance. The discovery of differences is a matter of straight empirical investigation. The later two parts of the problem, however, require theoretical analysis in order to formulate the hypothetical statements of relationships which are to be tested.

Since most theory of attitude and value formation centers heavily around the influence of reference groups, the explanation of differences in values and attitudes is drawn from this source. Personality needs are similarly involved except that instead of resulting from the influence of reference groups, they are factors in the selection of the reference groups.

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*Abstract of a study of the same title, sponsored financially by the Midwest Administration Center.

A high school teacher is seen to be subject to the influence of two important reference groups. These are the subject matter reference group and the teacher reference group. The former is the actual or idealized group consisting of former subject matter colleagues and college teachers. It may or may not be represented in the high school by a group of teachers of a particular subject. The teacher reference group consists of the authoritative and prestigeful group in the school whose orientation is teaching and Education rather than a particular subject matter field. With respect to certain values and attitudes these two reference groups are in conflict. Teachers differ in the extent to which they are oriented toward one or the other of the reference groups according to a number of factors.

They tend to be oriented toward the subject matter reference group because of their background of membership in a subject matter-oriented college group, because such an orientation is status enhancing compared to orientation toward the teacher reference group, and because the institutional organization of the high school focuses constant attention upon the subject matter field of teachers.

Teachers tend to be oriented toward the teacher reference group because of a background of membership in an Education-oriented college group, and because the teacher group is the membership group and, as such, is capable of applying sanctions against non-conformity.

Orientation toward the subject matter reference group has effects of administrative significance because of the normative function of the teacher reference group, expressed in such ways as blocking promotional aspirations, and because of the comparative function of the subject matter reference group, which invites comparison of the lot of the teacher with that of his non-teacher subject matter colleagues.

Thirteen specific hypotheses were drawn directly from this theory. They are worded here in terms of Subject Matter Characteristics (SMC) Scores. High SCM Scores purport to indicate orientation toward the subject matter reference groups, low SMC Scores, orientation toward the teacher reference group. The hypotheses are as follows:

1. SMC Scores are higher for teachers of less teaching experience than for those of more teaching experience.
2. SMC Scores are higher for teachers who have more academic training in their subject matter specialty than for those who have less academic traning.
3. SMC Scores are higher for teachers who have less training in Education than for those who have more.
4. SMC Scores are relatively high for teachers trained in university subject matter departments and in liberal arts colleges. They are relatively low

for teachers trained in university departments of Education and in teachers colleges.

5. SMC Scores are higher for teachers who prefer teaching assignments in the field of their training than for teachers who prefer assignments in other fields.
6. SMC Scores are higher for teachers with low Tenure Indices than for those with high Tenure Indices. (Tenure Index is years of teaching experience divided by number of schools in which full-time positions have been held.)
7. SMC Scores are higher for teachers with lower Global Satisfaction than for teachers with higher Global Satisfaction.
8. SMC Sores are higher for teachers with lower Social Satisfaction than for teachers with higher Social Satisfaction.
9. SMC Scores are higher for teachers with low Policy Satisfaction than for teachers with higher Policy Satisfaction.
10. SMC Scores are higher for teachers with lower Occupational Satisfaction than for teachers with higher Occupational Satisfaction.
11. SMC Scores are higher for teachers with lower Alternative Employment Perception than for teachers with higher Alternative Employment Perception. (A low score on A.E.P. indicates the perception that equivalent non-teaching job opportunities are plentiful.)
12. SMC Scores are higher for teachers who are higher on Conformity Pressure than for those who are lower on Conformity Pressure. (A high score on Conformity Pressure indicates that the teachers feel considerable pressure from the administration to conform to the school's educational policies.)
13. SMC Scores are higher for teachers whose Effectiveness is rated lower by the principal than for those whose Effectiveness is rated higher.

B. *Instrumentation and Methodology*

The instruments used to measure the psychological variables were the Edwards Personal Preference Schedule (15 scores), the Allport, Vernon, Lindzey "Study of Values" (16 scores), the Kerlinger Education Scale (1 score), and the Minnesota Teacher Attitude Inventory (1 score). The 23 scores for each teacher yielded by these instruments were the data used for the test of the basic hypothesis that teachers differ in needs, values, and educational attitudes according to their subject matter field. Male and female teachers, separately, were classified into subject matter field groups according to the major field in which they were trained. Tests of differences between the subject matter field groups were then conducted by simple analysis of variance technique on each of the 23 variables in turn.

The variables involved in the thirteen SMC Score hypotheses were measured by three instruments which were specially constructed for this study. The Teacher Background Information Questionnaire provided the necessary data for the variables, Teaching Experience, Academic Training, Education Training, Type of Institution, Assignment Preference, and Tenure Index. In form the instrument was a straight questionnaire soliciting factual information.

The VAC (Variables of Administrative Consequence) Battery provided measures of the following variables:

1. Global Satisfaction—over-all satisfaction with the teaching position.
2. Social Satisfaction—satisfaction with the social relationships existing among the teachers.
3. Policy Satisfaction—satisfaction with the educational policies of the school.
4. Occupational Satisfaction—satisfaction with teaching as an occupation as compared to non-teaching occupations which require similar subject matter training.
5. Alternative Employment Perception—the extent to which a teacher perceives non-teaching job opportunities to be avaliable.
6. Conformity Pressure—the extent to which a teacher feels under pressure to conform to the educational policies of the school.

In form the VAC Battery contained one six-point self-rating scale for each of the six variables. Each rating scale consisted of six graded statements one of which was to be checked.

The Principal-Rated Effectiveness Scale described six levels of teaching effectiveness worded in terms of degrees above and below the average effectiveness of teachers in the particular school. The principal of each school was required to assign to each teacher in his school a number corresponding to one of the levels of the scale.

In the tests of the thirteen specific hypotheses the Subject Matter Characteristics (SMC) Score was used as the measure of the orientation of teachers on a scale, the high end of which represents extreme orientation to the subject matter reference group and the low end of which represents extreme orientation to the teacher reference group. It is based upon the psychological variables which discriminate significantly between the subject matter field groups. In essence it compares the profile of a given teachers on these discriminating variables to two models. The first model is the profile of means of the total group of teachers of the particular sex. The second model is the profile of means of the teacher's subject matter field group. This is considered to be the best representative of the characteristics of the subject matter reference group although its deviations from the first model are diminished because of the confounding presence of teachers in the subject matter field group who are teacher-oriented. The SMC Score, then, is a measure of the extent to which an individual teacher exaggerates the characteristics of the model of his subject matter field group as opposed to the characteristics of the model of teachers in general. This score which was derived specially for this study is as follows:

$$\text{SMC Score} = \sum_{j=i}^{k} \frac{(\bar{X}_{Tj} - \bar{X}_{SMj})\ (\bar{X}_{SMj} - X_{ij})}{S_{Tj} S_{SMj}}$$

where j = any of the k variables included in the profile.

i = any teacher.

$\overline{X}_{Tj}$ = the mean of the total teacher group on variable j.

$\overline{X}_{SMj}$ = the mean of the subject matter field group on variable j.

S_{Tj} = the standard deviation of the total teacher group on variable j.

S_{MSj} = the standard deviation of the subject matter field group on variable j.

Teachers were divided into two groups, those oriented toward the subject matter reference group and those oriented toward the teacher reference group, by dividing the distribution of SMC Score at the mean. The hypothesized relationships were then tested by forming contingency tables with the two categories of SMC Scores on one dimension and categories of the particular variable in question on the other dimension. The direction of the relationship (hypothesized direction or reverse of hypothesized direction) was noted from the contingency table and the magnitude of the relationship was tested for significance against the Chi-Square distribution.

The theory as a whole was then tested by the Sign Test to determine the significance of its ability to predict the direction of relationships. The test itself requires the assumption of continuity in the distribution of degrees of relationships. This particular application of the test assumes that the relationships are hypothesized *a priori* and that the variables involved in the relationships are independent. These three assumptions are considered to be met.

C. *The Sample*

The sample of the study consists of 564 teachers and principals who represent approximately the total faculties of eight large high schools. Schools which were invited to participate were located within 150 miles of Chicago, but not inside the Chicago system, and had faculties of 50 or more teachers. The types of communities in which the schools were located varied from primarily residential to primarily industrial and from city suburb to independent town. They were located in three states—Illinois, Indiana, and Wisconsin.

Subject matter field groups which were represented by 10 or fewer teachers were eliminated from the study. The remaining sample was compared on several variables with independent samples to provide some basis of judgment for the degree to which the sample was similar to other groups. In most respects they were found to be similar to the other samples but, as would be expected, there was some bias evident toward their large urban school origin.

D. *Results*

The subject matter field groups of the male sample were found to differ with respect to AVL (Allport, Vernon, Lindzey) theoretical value (.001 level), AVL economic value (.001 level), AVL aesthetic value (.001 level), AVL political value (.01 level), Edwards n. affiliation (.05 level), Edwards n. change (.05 level), and the single score of the Kerlinger (.05 level). These seven variables plus Edwards n. heterosexuality, which showed differences significant at the .10 level, were used as the basis for the SMC Scores of the male teachers.

The female teachers differed by subject matter field groups on AVL theoretical (.01 level), AVL economic (.001 level), AVL aesthetic (.001 level), AVL political (.001 level), Edwards n. order (.005 level), and Edwards n. exhibition (.05 level). These six variables plus Edwards n. affiliation and Minnesota Teacher

TABLE 1

CHARACTERISTICS OF SUBJECT MATTER FIELD GROUPS OF MALE TEACHERS ON EIGHT PSYCHOLOGICAL VARIABLES WHICH DIFFERENTIATE BETWEEN THE SMF GROUPS*

SMF Group	AVL theoretical†	AVL economic	AVL aesthetic	AVL political	Edwards n. affiliation	Edwards n. change	Edwards n. heterosexuality	Kerlinger
Commerce	L	H	M	H	M	L	L	L
English	L	L	H	M	M	M	H	M
Industrial Arts	H	H	M	M	M	L	L	L
Mathematics	H	M	L	L	H	H	M	L
Physical Educ.	M	H	L	H	H	M	H	H
Science	H	L	L	M	L	M	M	M
Social Studies	M	M	H	H	L	H	M	H
Fine Arts	L	M	H	L	L	H	H	M
Principals	M	L	M	L	H	L	L	H

*On each variable the three highest-ranking SMF groups have been assigned the symbol H, the middle three the symbol M, and the lowest three the symbol L.

†The psychological variables are defined in the Appendix.

TABLE 2

CHARACTERISTICS OF SUBJECT MATTER FIELD GROUPS OF FEMALE TEACHERS ON EIGHT PSYCHOLOGICAL VARIABLES WHICH DIFFERENTIATE BETWEEN THE SMF GROUP*

SMF Group	AVL theoretical†	AVL economic	AVL aesthetic	AVL political	Edwards n. order	Edwards n. exhibition	Edwards n. affiliation	MTAI
Commerce	L	H	L	H	H	L	L	L
English	L	L	H	H	L	M	H	M
Foreign Lang.	L	M	H	M	M	M	L	L
Home Ec.	H	H	L	M	H	L	M	L
Mathematics	H	M	L	L	H	L	M	M
Physical Educ.	M	H	M	M	M	M	M	H
Science	H	L	M	L	L	H	H	H
Social Studies	M	M	M	H	M	H	H	H
Fine Arts	M	L	H	L	L	H	L	M

*On each variable the three highest-ranking SMF groups have been assigned the symbol H, the middle three the symbol M, anad the lowest three the symbol L.

†The psychological variables are defined in the Appendix.

Attitude Inventory score, which showed differences significant at the .10 level, formed the basis of the SMC Scores for female teachers.

Tables 1 and 2 indicate the content of the profiles for the various subject matter field groups for men and women teachers.

The tests of the thirteen specific hypotheses for the male sample showed significant relationships in the hypothesized direction between SMC Scores and Education Training (.05 level), Type of Institution (.001 level), Assignment Preference (.05 level), Tenure Index (.05 level), Global Satisfaction (.05 level), and Conformity Pressure (.01 level). Twelve of the thirteen relationships were found to be in the direction hypothesized. The Sign Test indicated that the theory as a whole is efficient in the prediction of the direction of relationships at a confidence level of .002. Two subsidiary tests of the hypotheses for the male sample provided similar results although the magnitudes of the relationships were reduced.

The tests of the thirteen specific hypotheses for the female sample produced inconclusive results. None of the individual relationships was significant. Moreover, the directions of the relationships were not highly consistent. Four were in the direction hypothesized whereas nine were in the reverse direction to that hypothesized. A two-tailed Sign Test indicated that this occurrence was not significant at the .05 level.

E. *Conclusions*

1. Subject matter groups of male secondary teachers of this sample differ from one another with respect to certain personality needs, dominant values, and educational attitudes. The basic hypothesis of the study, that such differences exist, is thus accepted as it applies to the male teachers.
2. The subject matter field groups of the female sample have been demonstrated to differ significantly on personality needs and upon dominant values. The basic hypothesis of the study, that subject matter field groups differ in personality need, dominant values, and educational attitudes, is therefore, accepted for the female sample with the qualification that differences in educational attitudes were not demonstrated.
3. In its ability to predict the direction of relationships for the male secondary teachers included in this sample the theory is substantiated at the .002 level of confidence.
4. The failure of seven hypothesized relationships for the male sample to reach significance indicates that the theory may not be accepted in its entirety on the basis of the tests of individual hypotheses alone. In view of the efficiency of the theory in predicting the direction of relationships, however, it is considered more likely that errors of measurement are responsible for the lack of significance than that the theory is inadequate.
5. Male high school teachers of this sample who are oriented toward their subject matter reference group compared to those who are oriented toward the teacher reference group:
   (a) have fewer semester hours of courses in Education.
   (b) are more often trained in universities, registered in subject matter departments, or in liberal arts colleges than they are in universities, registered in the Education departments or in teachers' colleges.
   (c) express the preference to teach the subject in which they were trained rather than some other subject.
   (d) more often move from school to school (as measured by Tenure Index).
   (e) are lower in over-all satisfaction with their teaching job.
   (f) feel under more pressure to conform to the educational policies of the school.
6. Differences in personality needs, dominant values, and educational attitudes which have been shown to exist between the different subject matter field groups of male secondary teachers have also been shown to be of more than theoretical interest to the study of administration. Through the medium of the theory these differences have been shown to be related to variables which are eminently important to the study of administration and to the actual operation of schools. The specific variables referred to are Tenure Index, Global Satisfaction, and Conformity Pressure.

7. For the female sample, the thirteen hypothesized relationships did not prove to be significant individually. Nor were they consistent in direction collectively.

8. The hypotheses applied to the female sample were those originally derived for males. A re-examination of the differences in social context for male and female teachers suggests that the inconclusive results of the tests of the hypotheses for females may be explained in terms consistent with the theory. The context for female teachers is seen to differ from that for males in that for females teaching is a relatively high prestige occupation, females are not as vulnerable to the threat of promotional sanctions as are males, and for many females teaching is a secondary occupation to marriage. Application of the theory to this newly conceived female context indicates that both reference groups would be expected to become relatively impotent. Under these circumstances the tests of the hypotheses would be expected to be inconclusive. This explanation, stemming as it does from *a posteriori* reasoning, may be advanced not as a finding of this study but as an hypohesis which requires independent verification.

F. *Implications for the Field of Administration*

1. In the interests of increasing common purpose among the personnel of schools great emphasis has been placed upon so-called "democratic" administration and the general human relations approach to administration. Any of the means used, however, must be based upon a sound knowledge of the phenomenon which it is intended to develop. The phenomenon is voluntary agreement with and willingness to pursue certain purposes. This is eseentially a problem of personality needs, values, attitudes, motives, and the like. It is at this point that the study is considered to make its greatest contribution to the study of administration. It has discovered groupings of teachers whose need, value, and attitude structures are relatively homogeneous and has indicated areas of basic differences. It has further contributed to knowledge of certain kinds of social behavior which is important to the operation of schools. In so doing it is considered to have contributed to an understanding of the factors involved in increasing shared or common purpose.

2. The differences in basic social psychological variables which have been shown to exist as between teachers of different subject matter fields and between male and female teachers cast considerable doubt upon the validity of assuming that teachers form a homogeneous occupational group. This study is seen to support the contention, then, of those who see the investigation of differences between teachers as more useful at the present stage of research in education than attempts to draw generalizations which pertain to all teachers. When more is known of the differences it will be more apparent which factors require control in the derivation of generalizations.

3. The question of the relative desirability of orientation of a teacher toward the subject matter reference group or towards the teacher reference group is not answered by this study. For female teachers it appears to make little difference. Depending upon one's view of Education the subject matter-oriented male teachers may be looked upon as the victims of an anti-intellectual atmosphere in our schools or as teachers who, in their preoccupation with their own subject matter specialty, do not have a grasp of the total educational process. In either case the findings raise real problems for those concerned with teacher education. Those male teachers who are trained in subject matter-oriented institutions and who have relatively few courses in Education have been shown to be inclined to orient themselves toward the subject matter reference group. If such orientation is considered to be un-

desirable some change may be indicated in this route to the teaching profession. If it is considered to be desirable some change may be indicated in the social context of teachers in the schools.

APPENDIX

Definitions of the Psychological Variables referred to in Tables 1 *and* 2.

AVL theoretical value—The dominant interest of the theoretical man is the discovery of truth. In the pursuit of this goal he characteristically takes a "cognitive" attitude, one that looks for identities and differences; one that divests itself of judgments regarding the beauty or utility of objects; and seeks only to observe and to reason. Since the interests of the theoretical man are empirical, critical, and rational, he is necessarily an intellectualist.

AVL economic value—The economic man is characteristically interested in what is *useful.*

AVL aesthetic value—The aesthetic man sees his highest value in *form* and *harmony.* He regards life as a process of events; each single impression is enjoyed for its own sake. He need not be a creative artist; he is aesthetic if he finds his chief interest in the artistic episodes of life.

AVL political—The political man is interested primarily in *power.* His activities are not necessarily confined to the narrow field of politics but leaders in any field generally have a high political value.

Edwards order—Order is the need to have written work neat and organized, to make plans before starting on a difficult task, to have things organized, and the like.

Edwards exhibition—Exhibition is the need to say witty and clever things, to talk about personal adventures and experiences, to say things just to see what effect it will have upon others, to ask questions that cannot be answered, to be the center of attention, and the like.

Edwards affiliation—Affiliation is the need to be loyal to friends, to participate in friendly groups, and the like.

Edwards change—Change is the need to do new and different things, to experience novelty and change in daily routine, to experiment and try new things, and the like.

Edwards heterosexuality—Heterosexuality is the need to go out with members of the opposite sex, to engage in social activities with members of the opposite sex, and the like.

Kerlinger Education Scale—A high score indicates a tendency toward progressivism in educational attitudes. A low score indicates a tendency toward traditionalism.

MTAI—The Minnesota Teacher Attitude Inventory measures the attitudes of teachers toward pupils. A high score indicates those attitudes which are commonly known as progresive. A low score indiactes those attitudes which are commonly known at traditional.

TRENDS AND PROBLEMS IN EDUCATIONAL RESEARCH

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Introduction

In the spring of 1957 the British Dominions and Colonies Program of the Carnegie Corporation of New York awarded the writer a travel grant to study educational research along the eastern seaboard of the United States. The ten week trip included visits ranging from half a day to a week, to public and private universities, city school systems, a State Department of Education, and private organizations engaged in educational research. Three weeks were spent in the Southeast region and seven weeks in the Northeast. No attempt was made to secure a representative sampling of organizations and institutions engaged in research. Rather, the attempt was to select a few and, if possible, to spend enough time to become reasonably familiar with their work. On this basis, these organizations and institutions were visited in the Southeast: Florida State University, University of Florida, University of Miami, Atlantic City School System, Southern Regional Educational Board, Alabama Polytechnic Institute, University of Atlanta, University of Georgia, Vanderbilt University, George Peabody College for Teachers, and University of Kentucky. The corresponding organizations and institutions for the Northeast were: Harvard University, Boston University, National Education Association, American Council on Education, the U.S. Office of Education, Educational Testing Service, Princeton University, Teachers College, four Research Bureaus of New York City, Bureau of Educational Research of the New York State Department, Psychological Corporation.

The actual conduct of the visit to any organization or institution originated with a letter stating the writer's interests in educational research, which were broad. These interests included: programs of research; coordination of research; interdisciplinary approaches; graduate student research and its relation to the foregoing; staff research; nature of research (pure vs, applied, action research, etc.); research methodology; use of machines; publication of research; organization, administration, and financing of research; agencies or research bureaus, institutes, etc.). The organization or institution then, in most instances, suggested persons who would be seen. Thus in Universities the writer was directed either to the Department of Psychology or to the School of Education and from there

to the various departments. In organizations, he was invariably directed to the research department, for example, the Research Division of the NEA, the Research and Statistical Branch of the U.S. Office of Education, the Research Division of E.T.S. In every instance, the actual conduct of a visit consisted largely in interviews ranging from half an hour to two hours with persons connected with research. Roughly two hundred persons were interviewed.

It should be noted that the writer's own bias was toward experimental research. However, in visiting an organization or institution, he tried to avoid forcing a pattern or mould onto its work. To the frequent question, "What are you looking for?" or "How can I help you?" the writer replied, "I am interested in educational research. What are you doing?" or "Tell me about your work." If there were no program of research or coordinated research, he looked for staff research; then graduate student research; then institutional research (on admissions and the relation of admissions to subsequent college success); then action research, or the survey or field service types of research; then service organizations such as reading clinics which frequently gather data suitable for research.

The writer would like to express gratitude to the Carnegie corporation for making this trip possible and to the many persons whose kindness and consideration made it so worthwhile.

Trends in Educational Research

Specialization Forty years ago, educational psychology could encompass educational research. Since then psychology has become differentiated into such areas as clinical, experimental, counselling, industrial, social, and the like. In addition, sociology, anthropology, group dynamics, communication and similar disciplines are doing research which can well apply to education. The problems raised by the trend toward specialization include an increasing reliance by educators on other disciplines doing the training of research workers for education. Education ,as such, appears to be producing very few persons trained as research workers (the traditional Ph.D.). Another problem, concomitant with the disappearance of educational psychology as the research medium for education, is the neglect of research in the psychology of the school subjects. Except for reading, how children learn the school subjects has been relatively neglected. A final consequence of specialization is the increasing need for interdisciplinary studies in broad areas.

Complexity Today's research worker has to master so many skills — in design, statistics, mathematical models, machine use, and the like — that the task of learning them looms large. Most professors acknowledge that the Ph.D. is an incomplete learning ex-

perience and that it takes another five years of research to have anything like mastery of the complex techniques of modern research. This raises the question of the utility of doctoral candidates on research teams. "It eats up half of your grant," said the head of one institute of research, "to train them into a research team." Perhaps worthwhile research can best be done by teams of experienced researchers. Such teams are uncommon in Universities.

Magnitude Worthwhile research increasingly involves larger numbers of subjects, greater cost, and the like. For example, between 1930 and 1937 the Stanford-Binet was revised and re-normed by Terman working from Stanford University. Between 1950 and 1955 the Wechsler Bellevue was re-normed by Psychological Corporation. Increased financial costs and large resources of trained research teams are inevitable in the trend toward increased magnitude of research projects.

Dispersion Forty years ago educational research was located in Universities. Now it occurs at Airforce bases, in organizations like E.T.S., in government agencies like the U.S. Employment Service of the Department of Labour, in City and State Department research bureaus, and the like. New trends are foreshadowed. Will these agencies publicize their research findings through the traditional channels (journals) or will their own technical publications become a new medium of communication? Will these research agencies more satisfactorily solve the coordination and financing of research, and so take over some of the more significant and large scale research from the Universities? Signs of both of these new trends can be perceived.

Problems in Communication

It is axiomatic in science that a researcher builds upon preceding research, and that the researches of one man fructify and stimulate the work of others. This "building block" concept of the growth of scientific knowledge is obviously based on communication. One of the problems of communication is from the research worker to the ultimate user of the research: the principal, teachers, curriculum coordinator, etc. Douglas Scates (University of Florida) suggests that many levels of interpretation are required. Thus, the language of the mathematical statistician, the "model constructor", or of the factor analyst must be translated for research users not expert in these fields. At a different level, the language of the special disciplines such as sociology or clinical phychology must be translated into terms usable by the curriculum maker. This task is currently done by text book writers, and by a host of pamphleteers. Yet, over and over, one hears the remark by University professors that "school

practice is lagging at least thirty years behind solidly verified research findings."

An omnipresent problem of communication is publication. This has many forms. In research bureaus (such as E.T.S., or the New York City Schools Educational Research Bureau) it was commonly observed that jobs were prescribed, prepared for presentation to interested parties, but no report made public. Again, many researchers complained of the length of time between acceptance of a paper and its publication, of the cost of reprints, and the like.. Librarians were perplexed with the increasing number of journals and with attendant problems of cost and shelf space. Some University professors complained about the straight-jacket policies of editors in prescribing length of article and format.

A still more frustrating problem is that of classification and indexing. An article on learning may be found in the Journal of Orthopsychiatry or in the American Journal of Sociology, or in any of a number of other journals. Several persons complained about existing indexes, such is Psychological Abstracts, on the score that they were too condensed, without adequate cross-reference. This was compared with the index of Chemical Abstracts which averages five or six cross-references. Education Index was considered adequate for its limited coverage.

A closely allied problem most frequently mentioned was "keeping up with the literature." R. L. Thorndike spoke for many when he said, "As the years go by one gets more and more discouraged by one's attempts to keep up with the literature in a subject", and he pointed to two stacks of journals, mimeographed reports, etc., literally two feet high. This problem is of course related to more and more publication, and to classification or selection of what one needs to read. Mr. Ian MacDonald's recent inquiry into this matter will be of interest.[1]

The most difficult problem of all in communication is to find out what other researchers are projecting for the future or are doing at present. Published research papers generally tell what colleagues were doing three or four years ago. Personal communications, visits during conventions, and other informal contacts appear to be the only occasions for communication about on-going research.

In one type of research, however, concealment is the rule. This is institutional research relating to admissions. Freshman average scores, cut-off points, and relation of these to subsequent college success, are frequently closely guarded secrets. Every university

[1]Ian C. MacDonald, "Educational Import of Growth of Learning," **Alberta Journal of Educational Research**, (March, 1957), pp. 6-23.

it appears does more or less of this type of research, but seldom publishes results.

So much for problems and trends in communication. Were there any solutions? One solution for the gap between school practice and verified research findings is the interpretive job of intermediaries like text book and pamphlet writers. A different solution is action research. The Horace Mann-Lincoln Institute of School Experimentation (Teachers College) has income from an endowment, a staff of fifteen to twenty (half full-time associates and half part-time research assistants), and is dedicated to research conducted in field laboratories. In the words of Dean Corey, "To the extent that the cooperating researchers in the associated schools merely collect data, not many changes take place in the school system. To the extent that they go beyond this (anaylze the problem, set up hypotheses, plan changes in practice, collect data on changes, etc.) then real changes take place in the school system". The scientific researcher traditionally collects data from the school system, analyzes it, and presents an article, monograph, or book. Then he complains that practice has not changed. People who have tried to change practice say that the method which works is action research.

A reasonably satisfactory solution to the annoying journal article references to "Unpublished Doctoral Dissertation" is *Abstracts of Dissertations and Monographs in Microfilm,* University Microfilms, 313 North First Street, Ann Arbor, Michigan. The abstracts cover dissertations in all subjects, are published monthly at an annual subscription of $16.00, are adequate in education and psychology (2,000 to 2,500 words), cover the major universities in the U.S.A., and are backed up by the microfilm of the dissertation for sale or rent.

Many solutions to the classification and indexing problems were suggested. One is to do for many subjects something similar to George Geothal's (Harvard University) work for Mental Health in Education. He has developed an exhaustive classification system. Articles are read, abstracted, and classified on this system. McBee keysorts cards can readily be used. A modification not involving abstracting can be attributed to David Saunders (E.T.S.). This would involve an organization or agency with a staff (Why not the A.C.E., foundation-supported?) which would classify articles sent by the journals as soon as they were set up in print. The article would be placed on a microfilm. The harassed professor could then have a standing order for all articles in certain classifications. This solution would leave the journals intact for professors who dislike micro-cards, who like marginal notes, and so on. Also, it avoids the difficulty of abstracting and the questionable practice

of the author doing his own abstract. It would permit multiple classification of any one article, and should not create trouble with current editorial boards and publishers.

The writer was informed that the Bio-Sciences Information Exchange of the Smithsonian Institute (113 Dupont Circle building, Washington D.C.) provides a communication service for research in the biological, medical, and psychological sciences. The major governmental grant-awarding agencies, and the foundations have agreed to file progress reports on research. Its services are free to granting agencies and investigators associated with recognized research institutions. The writer was informed (but not by the Smithsonian Institute) that by writing to the Institute it is possible to obtain information on current research in a *specific* area.

One rather cynical view expressed by a sociologist disposed of the current research communication problem neatly but viciously. This view was that the first rate researchers knew what the other first rate persons in the field were doing, and that the second raters didn't matter. Cynicism apart, this returns us to *levels* of communication. The giants in the field want to know problems and findings, while the less experienced want to know methods and techniques. Problems and findings require little space, but methods and techniques much.

Problems in Coordination

To what extent is research best done by the researcher working alone and unhampered, or at the other extreme, having a small assigned part in a large planned research program? On this issue many and diverse opinions might be quoted. With reference to graduate students, Philip Vernon (University of London) indicated that doctoral candidates were often "left pretty much on their own" at London Institute of Education. R. Kropp (Florida State University) and many others considered much of the value of graduate research to be a learning experience, the search for the problem, for example. Wm. Kvaraceus (Boston University), who is used to an interdisciplinary team approach and community studies, considered that the fact that a graduate student approached a professor indicated choice of an area and willingness to accept direction in that area. The same diversity of views can be found for staff research. "Creatively is an individual matter" is contrasted with the "interdisciplinary team approach", and of course all manner of intermediate positions can be identified, as follows.

Level I — Interdisciplinary team of professional equals with at least five years experience.

Level II — Team of equals, experienced as above, from various sub-disciplines within one discipline.

Level III — One experienced researcher and a group of new Ph.D. graduates.

Level IV — One experienced researcher and a group of Ph.D. candidates.

With respect to graduate student research, one finds variations from the "alone and unhampered" to the "small assigned part in a large planned research program". For example, at Harvard University (and elsewhere), the occasional strong-minded student selects a research area not necessarily close to the interests of his major advisor, and as a result is "left pretty much on his own". In many universities, the student works close to the advisor's area of interest, as for example Boston University, where the aspiring doctoral student must first be accepted by an advisor before he can become a candidate. A most common pattern is to find a cluster of graduate students working with one professor in his area of interest. Thus, Donald Super's (Teacher College) project in "Career Choices" has ten dissertations completed and fifteen ongoing. Coordination is evident where several professors are working in an area (for example Durrell, Murphy, Crosley, Noel, of Boston University reading clinic) and graduate students interested in the area carry out parts of a coordinated program. A possibly more difficult level of coordination is found where several professors from different disciplines conduct an extended research program. This was illustrated by the University of Florida studies in administration and supervision, where such men as Wiles (administration), Combs (psychology), Scates (research) and others met regularly as a team with graduate students to conduct a research program, which has produced some twenty doctoral dissertations over a period of four years.

Coordination of research at the staff level involves the three problems which underlie the above discussion. One is a question of *values*... Must the researcher be "free"? Can creativity be "directed"? Is imaginative research an "individual" matter? Scraps of evidence can be cited. I gather from directors of research bureaus that they would subscribe to no extremes. Such men as Herbert Conrad (Research and Statistical Department of U.S. Office of Education), Henry Dyer (Vice President in charge of research for E.T.S.), or J. Wayne Wrightstone (New York Schools Educational Research Bureau) would probably subscribe to the view that a research minded man, interested in an area, will do effective work in the area if the problem is assigned, but he works out the design and conduct of the study with his research team. Those who disagree

with this proposition (and the writer met some researchers who would) should note the large number of researchers who have become interested in mental deficiency since study of it has received large scale financial support. However, if the staff member believes that creativity is necessarily highly individualized and is stifled by group effort, he will likely avoid team research, unless (perhaps) he directs the team. In addition to the problem of values, coordination of research requires *finances,* which problem warrants a more extended discussion in the next section of this paper. The third problem in coordination is one of *human relations.* How can staff members learn to work together? Interestingly enough, Deans and Department heads can see this problem while staff members cannot (or do not). It is no accident, in the writer's view, that the best examples of coordinated research he saw in universities occurred in the field of administration and supervision, in institutions which stressed improved human relations as part of the training program in this area.

Considering the above problems of coordination, it is little wonder that in the universities visited, research bureaus, or any organized effort to coordinate educational research, were rare. If they existed they had modest aims which did not include the coordination of research above Level IV. Harvard University has a "Laboratory of Research in Instruction" headed by J. B. Carroll; Florida State University would like to start a "Bureau of Educational Research" (Kropp and Curtis); the University of Florida had one, it died, and Dean J. B. White rather wishes it were back in existence. Teachers College has the "Institute of Psychological Research" headed by Irving Lorge. The modest aims of such organizations are (1) a centre, a building, a haven, where research activities can be housed (function-space), (2) a staff of perhaps one professor full time, or some professors assigned part time to research, and clerical help, and perhaps technical (machine operator) assistance (function — to allocate man hours to research), (3) a presige factor in securing grants or charging for services (function-finance), (4) a place where those interested in research might meet and talk (function-to communicate). While some coordination may result from the above, it is a far cry from the kind of coordination necessary for large-scale break-throughs in educational research.

Coordinated research at Levels I and II is done by organizations such as E.T.S. and Educational Research Bureau, New York City Schools. Interestingly enough, while this solves the coordination problem, thus drawing on the time, experience, and specialization of a team, it raises new problems. One of these is "mandated" or required research continually intruding on ongoing research or even

pushing it aside. Another is the "frustration of creativity" if the foregoing occurs too frequently. However, the writer is impressed by the team approach at these levels, and believes that large-scale break-throughs on such problems as the learning of mathematics through the grades, or motivation for learning in the secondary school, require this team approach. The writer found only one such team approach in a University, namely, the previously mentioned Horace Mann-Lincoln Institute for School Experimentation (Teachers College). Will the function of coordinated research be taken over by organizations such as E.T.S., Psychological Corporation, or city Research Bureaus?

Problems in Finance

Large scale educational research of the kind which really pushes back the frontier of knowledge in a major "break through" is costly. This does not mean that costly research is necessarily good; nor that good research (especially on theoretical constructs) is costly.

The most frequent answer I got when I asked a University professor to tell about his research was the apologetic, "Well, I'm not doing as much as I should" or still more apologetic, "I know I should be doing some research but I just haven't time". Class load, administrative (committee) work, and graduate students take up so much time that the professor cannot do research. How much this is a rationalization and an acknowledgment of a stereotype that the professor is a researcher, is difficult to determine. It is quite likely that some people frankly prefer teaching, working with graduate students, and writing, but unlike Lawrence Shaffer (Teachers College) do not openly say so. However, when one starts getting facts: numbers of hours teaching per week, number of active graduate students, kind and role of committees, then one agrees that in many cases research could only be carried out on stolen time. This appears to be a universal problem — as J. B. Carroll (Harvard) puts it, "there needs to be more than 24 hours in the day."

Another persistent finding is that graduate students are frequently part-time, which hinders research at this level. Coupled with this is the paucity in number and amount of scholarships, fellowships, assistanceships, or whatever name is attached to subsidized higher education, which would permit of intramural studies.

Common, too, is staff dissatisfaction with the salary level. This may be irrelevant to research, or it may motivate extended research to develop eminence and a move to a higher paying job. However, low salaries are likely to encourage a non-research type of money earning activity such as consulting, speaking, writing, and the like.

It is an eye-opener to visit a number of University campuses and inquire the whereabouts of the Department of Psychology. The most frequent answers are, "In the basement of . . . . . " or "In the temporary buildings (i.e. old army huts)". This problem of space at a time of increasing enrollment is universal, but space is required to do research. Especially lacking is any sort of office space for graduate assistants.

Machine processing of data, and statistical analysis by machines, can revolutionize research (at a price). Any institution which can afford a machine installation can do work which was not dreamed of before. Ask any machine man, and he will tell you (in the the words of Philip Rulon of Harvard) that machines are here to stay. He will also agree with John Alman (Boston University Office of Statistical and Research Services) that a bare minimum installation would cost $500 a month machine rental and an equal amount for salaries and overhead. An adequate installation would cost very much more.

Research itself costs money. It appears obvious that if each staff member were to spend half his time on research, the institution should double its staff. Space, clerical assistance, materials, consulting service, library, use of machines, and other incidentals add up to an impressive total.

These are indicative of the problems of finance in university research. What are the solutions one sees? The most common were grants for "research projects", such as those awarded by the U.S. Office of Education, the National Institute for Mental Health, and various foundations. The largest grant of this sort the writer encountered was for Teachers College (Maurice Fouracre) Mental Retardation Project ($66,000); but far more typical was the $20,000 grant. Such grants are awarded on the basis of soundness of design, significance for education, and adequacy of facilities and personnel, in that order.

It is obvious that this solution to financial problems of educational research may raise a new problem, viz., that the areas of research may be determined by granting bodies. This is, in fact, the case. Govermental agencies were directed by law to allocate certain portions of the grants to certain areas. Notably, one finds a large number of research projects on mental deficiency. Another new problem is the use of the researcher's time in securing such grants, and in administering them after they are secured.

A second solution to the problem of financing educational research is unique to the institution, and is some arrangement for supporting educational research directly. Such financial backing is

usually pitifully small. One good example is the University of Georgia's research fund, administered by the School of Graduate Studies. Any staff member may apply through his Dean for a research grant, which may, for example, free him one third time for research work. Such limited financial support for educational research is probably as extensive in universities as it is relatively ineffective.

A third unique solution for financing educational research is the endowed research institute at Teachers College. It has funds, a staff, and a program. It seeks to do cooperative applied research with school systems, which involves the school system in the research.

It is obvious that there are no adequate and far-reaching solutions for the financial problems of educational research. The limited financial support given to higher education in our society has to be divided among buildings, salaries, scholarships, and research. Another division has to be by major disciplines: medicine, law, engineering, liberal arts, education, etc. (One Dean of Education remarked about the University in which the School of Education annually made a "profit" of half a million dollars which supported the Medical School). These divisions probably reflect basic value-judgements in our society.

Summary

As a result of a ten week observation of educational research in various institutions and organizations along the Eastern seaboard of the U.S.A., the writer has presented his impressions about trends and problems. The trends noted were increased *specialization, complexity, magnitude,* and *dispersion.* Each of these trends raised problems in educational research. The major problems of educational research as viewed by the author were *communication,* (including publication, indexing and classification, keeping up with the literature, and keeping up with current or on-going research); *coordination* (which involved levels in terms of experience or skill, and in terms of variety of disciplines represented, and also involved values, finances, and human relations); and *finances* (which include staff load, subsidized higher education for students, space, machines, equipment, etc.). Where solutions to these problems were evident, they were described; and beyond that forecasts were made or questions raised about future trends.

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